c/c 96000438 (cont.)

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Barcode Number	Box Number	Total of Volumes	Call Number
LIBRARY OF CONGRESS 0 029 767 382 8	1914	123	TG140.S8 no.1-123 (1945-Undated) no. 60, 62, 117 in oversize box
LC Control Number clc96 000439	1915	—	Empty —
LIBRARY OF CONGRESS 0 029 767 383 A	1916 1 BOX	9	TH85 — TH148
	1917	2	TH223.Z9 no.1-2 (1929-Undated)
LIBRARY OF CONGRESS 0 029 767 384 1	1918	17	TH223.Z9 no. 1-17 (1910-Undated) no. 7 in oversize box
LIBRARY OF CONGRESS 0 029 767 385 3	1919	27	TH223.Z9 no. 1-27 (1907-Undated)
LIBRARY OF CONGRESS 0 029 767 386 5	1920	10	TH223.Z9 no. 1-10 (1906-44)
LIBRARY OF CONGRESS 0 029 767 387 7	1921A	18	TH223.Z9 no. 1-18 (1906-31)

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Barcode Number	Box Number	Total of Volumes	Call Number
LIBRARY OF CONGRESS 0 029 767 388 9	1921 B 1 BOX	2	TH223.Z9 (1934–Undated)
	1922	5	TH223.Z9 (1909–26)
LIBRARY OF CONGRESS 0 029 767 389 0	1923 A 1923 B*	12	TH223.Z9 no. 1-12 (1908–37)
LIBRARY OF CONGRESS 0 029 767 391 9	1924	14	TH223.Z9 no. 1-14 (1908–Undated)
LIBRARY OF CONGRESS 0 029 767 392 0	1925	11	TH223.Z9 no. 1-11 (1907–Undated)
LIBRARY OF CONGRESS 0 029 767 393 2	1926	13	TH223.Z9 no. 1-13 (1905–44)
LIBRARY OF CONGRESS 0 029 767 394 4	1927	11	TH223.Z9 no. 1-11 (1904–26)
LIBRARY OF CONGRESS 0 029 767 395 6	1928 A	21	TH223.Z9 no. 1-21 (1909–Undated)

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1928 B 8 TH223.Z9 no. 22-29

Barcode Number	Box Number	Total of Volumes	Call Number
LIBRARY OF CONGRESS 0 029 767 396 8	1 BOX 1929	8	TH223.Z9 no. 1-8 (1911-45)
LIBRARY OF CONGRESS 0 029 767 397 A	1930	12	TH223.Z9 no. 1-12 (1913-45)
LIBRARY OF CONGRESS 0 029 767 398 1	1931	22	TH223.Z9 no. 1-22 (1908-36)
LIBRARY OF CONGRESS 0 029 767 399 3	1932	11	TH226.Z9 no. 1-11 (1907-29)
LIBRARY OF CONGRESS 0 029 767 390 7 *	1923B	3	TH223.Z9 no. 13-15

A Professional Creed

CARDINAL PRINCIPLES OF N. S. P. E. RESTATED

TWENTY-FIVE TENETS OF GUIDANCE

SET FORTH IN SEPTEMBER 1936 ISSUE OF

THE AMERICAN ENGINEER

AS APPLICABLE TODAY AS THEN

By President D. B. Steinman

D. B. STEINMAN
Past President, N. S. P. E.

In the midst of the conflict of opinion and confusion which has attended recent efforts of some engineering groups who profess to be seeking leadership for the profession as well as social and economic protection for its members, the statement of policy of the National Society of Professional Engineers as enunciated by President D. B. Steinman in 1936, the second year of the Society's existence, merits repetition. Its clarity and conciseness are indicative of the definitiveness of purpose of N.S.P.E. Its recognition of indispensable fundamentals of social and economic as well as professional aspirations offer evidence of the soundness of both purpose and organization which lies behind the professional engineering movement.

WE are members of the National Society of Professional Engineers because we believe in the following principles to which it is dedicated:

1. *Engineering is a Profession.* As members of that Profession, it is our moral obligation to strive for its advancement.

2. Engineering is a *learned* Profession. The highest educational prequalifications must be maintained for admission.

3. Engineering is *one* Profession. It should be held legally indivisible, and any move to divide it must be opposed.

4. *Before it can expect recognition, a Profession must be recognizable.* A clear dividing line must be established whereby the public may distinguish the Engineer from the non-engineer.

5. *Registration is the only means of establishing this demarcation.* Without Registration Laws, there is no way to stop the practice of Engineering and the appropriation of the designation Engineer by the unqualified and the unprofessional.

6. *Registration establishes Engineering as a legally defined and recognizable Profession.* It places the force and sanction of the law behind the efforts and aspirations of the Profession to maintain high standards of qualifications and practice.

7. *Registration is the most important agency for the advancement of the Profession, its standards and its standing.* Registration has been used effectively by other Professions as a powerful instrumentality for raising educational qualifications, ethical standards, professional status, and public recognition. Every effort should be devoted to extend Engineers' Registration legislation to the remaining States, and to improve existing Registration Laws to a uniform high standard.

8. *Protection of the Professional designation is as important as protection of practice.* A Profession is judged by the qualifications of all who use its name, and the public is confused and misled by the misappropriation of the title

9. In any State in which an Engineers' Registration Law is established, *no man is an Engineer unless he is registered.* Existing exemptions in Registration Laws permit non-engineers, under certain conditions, to do engineering work, but such exemptions do not make any man an Engineer.

10. *The only agency that can admit a man into the Engineering Profession is the legally authorized State Board.* This responsibility cannot be delegated nor shared.

11. *No college can admit a man into the Engineering Profession by conferring a degree.* Additional qualifications are required for Professional status.

12. *Membership in an Engineering Society does not make a man an Engineer.* He should be an Engineer before he is admitted to membership. The National Society of Professional Engineers is the only organization in which all of the members are Engineers.

13. In addition to being defined, *a Profession must be integrated.* Technical societies are organized on the basis of *dividing* the Profession into branches and specialties. The National Society of Professional Engineers is organized on the principle of *uniting* all Engineers as members of one Profession.

14. *The technical problems of Civil, Mechanical, Electrical, Chemical and Mining Engineers are divergent, but the Professional problems are alike.* The National Society of Professional Engineers supplies the need of a nation-

(Continued)

Hart Crane And The Bridge

IMPRESSIONS INSPIRED IN A POET
BY A GREAT HUMAN ACHIEVEMENT
TOGETHER WITH SOME FLIGHTS
INDULGED BY HIS ENGINEER REVIEWER

David B. Steinman

DR. D. B. STEINMAN
Past President, N.S.P.E.

In the commentary published herewith, which was written as a result of research incident to a work entitled "The Builders of the Bridge", the author, David B. Steinman, distinguished engineer and first president of the National Society of Professional Engineers, gives play to some flights of thought and language worthy of the subject of his reflections. Some one has said that the poet and the mathematician have been cast from the same mould.

Hart Crane and "The Bridge"

In 1924 a young poet was living at 110 Columbia Heights in Brooklyn—within the range of the harbor and its sea-sounds, within the spell of the Bridge and its magic beauty. Hart Crane was a strange seer of timeless vision, a fevered mystic who felt the impact of inchoate forces. He sang of machines and cities, of the ear-tang of the workers, of the warring hungers of lonely and herded men. In the sensitive quest of the mystic to find symbolic expression of the intimate sense of continuity between his self and the cosmos, and in the desperate impulse of the poet to create rhythmic order from the chaos which overwhelmed him, he sought unitary theme to integrate the exuberant flood of his impressions; and he found this unifying poetic principle in the symbolism of the great arching link that man had built in vaulting height above the tides. By the fall of 1925 he had achieved the pattern of his composition, and in December 1929 he completed the poem—the crowning work of his life.

Seemingly some mystic spiritual echoes had lingered there—for, ere the final stanzas were penned, Crane learned that the house in which the vision of *The Bridge* had first come to him, and where he presently finished the poem, had once been the home of Washington Roebling, and that the very room in which the poet lived and wrote had been used by the paralyzed engineer of the Brooklyn Bridge as an observation tower to watch the construction of the span. After the lapse of half a century, in the same house and in the identical room, and inspired by the same objective vision, another human should in fevered travail make its bid for immortality. Never again did Hart Crane attain the same height of poetic creation. Three years later, returning from a visit to Mexico, he walked to the stern of the *Orizaba*, quietly took off his coat, and leaped into the embrace of the warm sea he loved.

The poem, with a sturdy singing cadence like the march of the pioneers, depicts kaleidoscopically the cavalcade of our civilization—the emergence of our industrial world of power and speed from the naked and colorful base of old America. *The Bridge* is the unifying vision, the mystic link—to synthesize the world of chaos. Made by man, with his new power—the machine—the great span joins city, river, and sea; parabolawise, it shall vault the continent and, transmuted, it shall reach that inward heaven—the fulfillment of man's need of order, the exaltation of man's soul.

The *Poem* is captioned: TO BROOKLYN BRIDGE

"How many dawns, chill from his rippling rest
The seagulls wings shall dip and pivot him
Shedding white rings of tumult, building high
Over the chained bay water Liberty—

Then, with inviolate curve, forsake our eyes
As apparitional as sails that cross
Some page of figures to be filed away;
—Till elevators drop us from our day .

I think of cinemas, panoramic sleights
With multitudes bent toward some flashing scene
Never disclosed, but hastened to again,
Foretold to other eyes on the same screen;

And thee, across the harbor, silver-paced
As though the sun took step of thee, yet left
Some motion ever unspent in thy stride,—
Implicity thy freedom staying thee!

Out of some subway scuttle, cell or loft
A bedlamite speeds to thy parapets,
Tilting there momently, shrill shirt ballooning,
A jest falls from the speechless caravan.

Down Wall, from girder into street noon leaks,
A rip-tooth of the sky's acetylene;
All afternoon the cloud-flown derricks turn . .
Thy cables breathe the North Atlantic still.

(Continued)

The Scientific Research Society of America

RESA

Because of the interest and generous contributions of the late Dr. William Procter, the organization and operation of RESA during the founding years placed no financial burden upon Sigma Xi. His generous bequest of $100,000 to the Society will continue this support as well as provide for the annual award of the William Procter Prize for Scientific Achievement. This prize of $1,000 was established in 1950 and the first recipient was Dr. Karl T. Compton, Chairman of the Corporation, Massachusetts Institute of Technology. The second recipient was Dr. Ernest O. Lawrence of the University of California. In 1952 the prize was awarded to Dr. Shields Warren of the Cancer Research Institute, New England Deaconess Hospital, Boston, Mass., and in 1953 to Dr. David B. Steinman, eminent bridge designer and engineer of New York City. The 1954 recipient was Dr. Vannevar Bush, President of the Carnegie Institution of Washington, D.C.

READER'S DIGEST EDUCATIONAL REPRINT

THE BUILDERS OF THE BRIDGE

In 1883 the Brooklyn Bridge was a marvel of engineering. It still is.

Edwin Muller

Based upon the book by D. B. Steinman

When the Brooklyn Bridge was finished in 1883, it was the longest single span ever built. It was the tallest and strongest and the first to use steel cables. Today there are bigger bridges. But they never could have been built had not Brooklyn Bridge showed the way. Its story is still the greatest bridge-building story of all.

The best time to see the Bridge is at dawn. From the mists hanging low on the water rise two mighty towers. Their granite is now black with the grime of more than half a century. The four big cables sweep down from the towers in great curves to meet the roadway. The delicate spiderweb of the wire supports holds all together. Although built for strength, the Bridge has beauty.

This great span is the magnificent monument of two men. John A. Roebling dreamed of the Bridge and then put his dream into practical plans. Washington Roebling, his son, built it. It is a monument such as few men in all history have had, but it cost them much suffering.

As a young engineering student, John Roebling saw the first suspension bridge built in his native Germany. He was fascinated by the suspension method. He wrote his college graduation paper about this method.

In 1831, at the age of 25, Roebling came from Germany to western Pennsylvania. After clearing a farm, he worked at building houses and as a surveyor. But in the evening he studied the building of suspension bridges.

One day John Roebling watched some men using heavy hemp rope, three inches in diameter, to haul heavy loads. Suddenly one of the ropes broke. The heavily loaded car crashed down the slope and killed two men.

In a flash, an idea came to John Roebling. If a rope could be made of iron wire that would bend, it would be stronger than a hemp rope

Michigan Tradesman

Founded 1883 November, 1955

X-TG140

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BRIDGING THE STRAITS

Pictorial Progress Report

Mackinac Bridge Authority. Photos by Herman D. Ellis

● Racing against a winter shut-down deadline, the exact date as yet unknown, contractors building the bridge across the Straits of Mackinac, connecting Michigan's Upper and Lower Peninsulas, can also look back on a construction season filled with almost breathtaking accomplishments. To name a few:

Two of the deepest underwater foundations ever constructed were successfully founded on bedrock more than 200 feet below water level, are concreted, and now support the two main towers.

Both towers have been erected to heights of over 540 feet, and by the time these words are in print both will have reached their full 552-foot heights.

Foundations have been completed for all the 34 piers on which the bridge will rest. Most piers are nearing completion to the levels of the truss spans which will support the roadway.

The 472-foot south backstay span has been completely assembled on barges and, weather permitting, will have been floated into place and lowered onto its supporting piers by the time this is in print. Three weeks later the north backstay span will be ready to place.

Catwalks, which will be used by bridgemen in spinning 41,000 miles of wire into the huge cables, have been prefabricated and are in storage yards ready to suspend from anchorage-to-tower-to-tower-to-anchorage when contractors are ready.

Wind tunnel tests, completed this season, show the Mackinac Bridge to be by far the safest bridge, aerodynamically, that has ever been designed.

The Story Of
THE MACKINAC BRIDGE

ONE DOLLAR

Gift of Bridge Designer Helps Student Engineers

Through the generosity of one of the nation's foremost bridge designers, Newark College of Engineering, Newark, N. J., has received a $10,000 grant from the David B. Steinman Foundation. The fund will be used to make loans for tuition and other expenses of the students.

The foundation was established earlier this year by David B. Steinman, New York consulting engineer. Its purpose is to help deserving engineering students—through scholarships, awards and loans—to complete their undergraduate studies or to undertake graduate work in engineering. According to Steinman, the program was inspired by his own lifelong gratitude for financial assistance he received during his student days at City College of New York and Columbia University.

Under the terms of the Newark grant, known as the David B. Steinman Fund, loans will represent a "debt of honor" to be repaid voluntarily—promissory notes will not be required. As the loans are repaid, the grant will become a revolving fund for the benefit of students in future years.

A former professor of civil engineering and author of numerous books and articles on bridge construction, Steinman has been honored around the world by many colleges, universities, professional societies and nations for his achievements in the field of bridge design on five continents.

Among his famous works are the Florianopolis suspension bridge in Brazil, the largest bridge in South America; the Thousand Island Bridge, of measuring dimensional changes of concrete, dynamic tests of building materials, and investigations of lightweight aggregate and cellular lightweight concretes. Author of several technical publications, Valore is active in the work of the American Society for Testing Materials, the American Concrete Institute, and the Highway Research Board.

AN ENGINEERING NEWS-RECORD REPRINT

June 16, 1955

ONLY THY SPARK

By D. B. STEINMAN

We are but human, earthy, frail.
Only Thy spark can animate
And give us strength to face the gale,
With joy to dream, aspire, create.

We need Thy glow to learn the way
To lift men's hearts, to sing Thy song.
Transmute with fire this earth-born clay,
To make life beautiful and strong.

Reprinted from the
October 1955 issue of
PARTNERS MAGAZINE

Chicago Daily Tribune
THE WORLD'S GREATEST NEWSPAPER

Mon., June 27, 1955

GRANITE, STEEL, AND DREAMS

The river barrier said, "I dare,"
And man replied, "I can."
Of steel and granite, dreams and faith,
Man built a wondrous span.

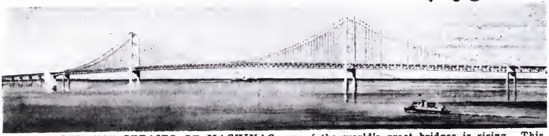
Around the bridge in afterglow
A magic city gleams;
Its towers, too, are built by men
Of granite, steel, and dreams.

D. B. Steinman

[Mr. Steinman is one of the country's most prominent bridge engineers. He is now working on the Sault Ste. Marie International bridge.]

World's Largest Suspension Bridge Is Under Construc

Straits of Mackinac Span, Once Called 'Impossible,' Achieved by Engineers; It Is Five Miles Long.



ACROSS THE STRAITS OF MACKINAC one of the world's great bridges is rising. This spective drawing of the suspension bridge at the middle of the Mackinac crossing. This part is long. Main span is 3,800 feet.

The world's largest suspension bridge, 8,614 feet from anchorage to anchorage, connecting the Upper and Lower Peninsulas of Michigan, is being built across the Straits of Mackinac—a $99,800,000 project which challenged the imagination of engineers for three-quarters of a century and which was called "impossible"by the faint of heart.

The entire bridge is five miles long. In the center, where the water is deepest—across a submerged glacial canyon—is to swing a 3,800-foot main span.

Started in July, 1954, the Mackinac Bridge is well on the way to meet the scheduled completion date of November, 1957, according to D. B. Steinman, New York consulting engineer.

When the great bridge is finished, trucks and passenger cars which are now ferried across the straits in something over an hour will make the crossing in 10 minutes. And they will not have to wait to get across. Waiting time in the summer seasons runs to three or more hours. On holidays and during the deer-hunting season, waits have been as long as 17 hours, with vehicles stretching back on the roads for as much as 20 miles.

Many Spent the Night

Weary motorists often drive into a parking field for the night, find a place to sleep, then take their places in the lines in the morning. Films of such conditions helped convince investors and bankers that the bridge was needed.

Proposed toll rates will average 10 per cent higher than present ferry rates. At an average toll rate of $3.08 per vehicle ($2.10 for a passenger car, more for trucks), the estimated traffic of 2 million vehicles in 1958 will yield a revenue of more than $6 million in the first year of operation, said Mr. Steinman. According to traffic experts, the bridge will pay for itself in 18 years, and then can be made toll-free.

The Straits of Mackinac—pronounced Mackinaw—joins Lake Michigan and Lake Huron and divides Michigan into the 16,500-square-mile Upper Peninsula and the 41,700-square-mile Lower Peninsula. The Upper Peninsula contains forests, mines, farms and vacation resorts. The Lower Peninsula, highly-industrialized, contains most of the population and the big production centers.

Major highways of Michigan converge at Mackinac City on the south and St. Ignace on the north of the Straits of Mackinac. The bridge will funnel traffic from the southern into the northern part of Michigan and thence into Canada by way of Sault Ste. Marie, 50 miles north of the straits. It will provide a shorter east-west route for bonded truck traffic between southeastern Ontario and the west of Canada.

Truck Traffic Grows

Truck traffic on the Mackinac ferries has been increasing rapidly and amounts to 12 per cent of the vehicular traffic. Although rates on the ferry went up 45 per cent in 1953, traffic rose above the 1952 period.

Governor G. Mennen Williams of Michigan has said that the builders of the bridge "are participating in empire-building."

In an article, "The Mackinac Bridge, Conquering the Impossible," Mr. Steinman says:

"The difficulties, both physical and financial, appeared insurmountable. Various plans and designs were proposed from time to time during the past 40 years. Some of the schemes would have been fantastic in cost, but the promoters did not know it. One official design for the proposed bridge would have collapsed before completion, but the officials did not know it.

"People (who were not engineers) said that the project was impossible; that the cost would be prohibitive; that it could not be financed; that the bridge could not be built; that the foundation problems could not be solved; that the wide glacial gorge under deep water in the middle of the Strait could not the spanned; that the bridge, if built, would not stand up; that it would be destroyed by the elements; that no foundation piers could withstand the pressure of ice from the Great Lakes in winter; that no span could withstand the storms and wind forces at the site.

"Despite all obstacles and difficulties, both natural and man-made, the project has now been successfully financed; all of the engineering problems have been successfully, economically and safely solved."

The 3,800-foot central span of the suspension is 300 feet longer than the span of the George Washington Bridge, and is exceeded only by the 4,200-foot span of the Golden Gate Bridge.

The foundations under the two main towers of the suspension bridge, one at each rim of the submerged glacial gorge, were carried down to rock, reaching "the remarkable foundation depths of 205 feet and 210 feet, respectively, below the water surface."

Artistic Steel Towers

The suspension bridge cables are carried on artistic steel towers 550 feet high, each containing 6,250 tons of structural steel. The suspended trusses, carrying the roadway, have a normal clear height of 155 feet above the water.

Mr. Steinman cites impressive figures to demonstrate the magnitude of the foundations and "the resulting stability against the most severe wind reactions, ice pressure, or any other conceivable loads or forces."

In each of the main piers, which are 116 feet in diameter, the concrete alone weighs 145,000 tons. The steel tower superimposed on the pier weighs 30,000 tons.

Total pull of the two cables upon each anchorage is approximately 30,000 tons. To resist this pull, the weight of the concrete alone in each anchorage is about 5½ times as much—or 170,000 tons.

Total length of the bridg the approaches is 26,444 fe and 44 feet).

Total concrete in the sul anchorages, piers and fou 440,000 cubic yards. Of t 350,000 cubic yards are pl water.

Total weight of the steel ture—cables, structural steel way—is 66,550 tons.

Thirty-three spans are ca piers.

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The Mackinac Bridge was created by the Mich lature in 1950. The Au pointed a board of consu neers composed of O. H G. B. Woodruff and Mr The board reported in 19 bridge was feasible. In Ja Mr. Steinman was selecte and supervise constructi bridge. He engaged Mr. his associate consultant.

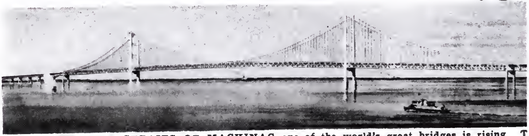
Through the spring of rials and equipment were In July excavation beg underwater foundations. 750 men toiled at the site, to 24 hours a day in a winter. Piers and anchor be down to the rock befor came. Bad weather often crews. They worked in rough water, through col storms until ice stopped tl uary 14 of this year. B won the race.

Reprinted from Transport Topics

NOVEMBER 21, 1955

World's Largest Suspension Bridge Is Under Construct

Straits of Mackinac Span, Once Called 'Impossible,' Achieved by Engineers; It Is Five Miles Long.



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Reprinted from **Transport Topics**

NOVEMBER 21, 1955

American Engineer

NOVEMBER

1955

Volume of Poems Published by Steinman

Dr. David B. Steinman, world-famous bridge engineer and the first president of the National Society of Professional Engineers, has added another to the list of books that he has authored. This time it is a collection of poems he has written.

Entitled *I Built a Bridge, and Other Poems*, the book is published by The Davidson Press of New York and features an introduction by the writer, Elias Lieberman. A number of the poems included were originally published in the American Engineer.

Columbia Alumni News
November 1955

Engineering

Steinman pays "debt of honor" with $10,000 gift

A $10,000 "debt of honor" scholarship fund in Engineering was established in September by David B. Steinman, '09E, '09MA, '11PhD. The grant, one of six made to institutions over the past year by the David B. Steinman Foundation, was given in return for $650 aid that Dr. Steinman received while he was a student at the University. To date he has given $65,000 to the Engineering School, or one hundred times the amount he himself once received.

While a student in Engineering, Dr. Steinman designed the Henry Hudson Bridge for his Civil Engineering thesis, and although the actual construction occurred 25 years later, his original plans were used. Among other accomplishments, he is also responsible for the design of the Thousand Islands Bridge which links the US and Canada, the Mackinac Bridge now being built in Michigan, and the reconstruction of the Brooklyn Bridge.

American Engineer

JULY

1955

American Engineer
21st YEAR OF PUBLICATION

International Prize Awarded to Steinman

Dr. David B. Steinman, consulting engineer and well-known bridge designer, has been awarded the *Grand Prix International de l'Invention* (International Grand Prize for Invention) in recognition of his inventive and scientific contributions and achievements in the design and construction of some of the world's most outstanding bridges.

The award was made at Paris on June 3 by the unanimous vote of the Jury of the Permanent Committee of the *Grand Prix.* The Permanent Committee was founded at Paris in 1954 by representatives of national and international organizations of scientists and inventors. The *Grand Prix International,* of which Dr. Steinman is the first recipient, will be the highest honor the group will bestow.

An officer of the Committee will bring the medal and diploma of award to the United States to present them to Dr. Steinman in a special ceremony.

THE PORT HURON TIMES HERALD

WEDNESDAY, JUNE 8, 1955

450 Engineers To Gather Here

State Convention Opens Thursday

The eighth annual convention of the Michigan Society of Professional Engineers, Thursday through Saturday in Gratiot Inn, will carry an international flavor.

Members of the Sarnia affiliate of the Engineering Institute of Canada have been invited to participate in the convention as guests by the Blue Water chapter of the Michigan Society, host to the gathering.

* * *

DR. D. B. STEINMAN, designer and chief engineer of the $100,000,000 Straits of Mackinac bridge, will be among about 450 engineers expected to attend. He will speak on "Conquering the Impossible."

A Port Huron engineer will be installed as president of the MSPE. He is L. M. Dunn, owner of Dunn Construction company.

Gov. G. Mennen Williams will attend the convention Thursday night.

Mayor Thomas E. Woods will welcome delegates at a luncheon from noon to 1:30 p.m. Thursday.

Fred A. Crist, president of the Blue Water chapter, will be chairman.

* * *

IN THE AFTERNOON session from 2 to 5 p.m., Paul S. Calkins, Detroit, past president of the MSPE, and Virgil E. Gunlock, Chicago, vice president of the Central Region, MSPE, will give reports.

Dr. Steinman will speak at this session.

The Times Herald Radio Station, WTTH, will record Mr. Steinman's talk for rebroadcasting at 8 p.m. Thursday.

Internationally famous as a bridge designer and engineer, Dr. Steinman has served as designing or consulting engineer in the construction of many notable bridges in five continents.

Six of his bridges have been honored in the annual awards for the most beautiful bridges in America.

He has received numerous honors, both national and international, for distinguished achievements.

* * *

DR. STEINMAN has achieved recognition as an engineer, scientist, mathematician, artist, inventor, bridgebuilder, educator, lecturer, author, poet, and humanitarian.

The Bridge At Mackinac

By D. B. Steinman

In the land of Hiawatha,
Where the white man gazed with awe
At a paradise divided
By the straits of Mackinaw —

Through the depths of icy water,
Battling tides around the clock,
Men are dredging, drilling, blasting,
Driving caissons down to rock.

Fleets of freighters bring their cargoes
From the forges and the kilns;
Stone and steel—ten thousand barge-loads—
From the quarries, mines, and mills.

Now the towers, mounting skyward,
Reach the heights of airy space.
Hear the rivet-hammers ringing,
Joining steel in strength and grace.

High above the swirling currents,
Parabolic strands are strung;
From the cables, packed with power,
Wonder-spans of steel are hung.

Generations dreamed the crossing;
Doubters shook their heads in scorn.
Brave men vowed that they would build it—
From their faith a bridge was born.

There it spans the miles of water,
Speeding millions on their way—
Bridge of vision, hope, and courage.
Portal to a brighter day.

The Cooper Union Alumni Gathering • October 6, 1956

Citations for Distinguished Alumni

Tribute by Justice Felix Frankfurter

DAVID BARNARD STEINMAN

Civil Engineer, bridge-builder, scientist, inventor, man of letters, humanitarian — the roster of your achievements is a witness to your amazing versatility. As a designer of almost four hundred bridges on five continents you are internationally acknowledged as a master in combining engineering skill with architectural beauty. You have disseminated your knowledge and experience as an authority on long-span bridges through numerous books and monographs. Your career has been an inspiration to thousands of young engineers and engineering students. Among your many services to society has been the founding of the David B. Steinman Foundation for grants to education, for research, and for student aid. Because you have been notable in carrying out the aspirations of Peter Cooper for the advancement of science and art, your Alma Mater chooses you for this citation.

The Cooper Union for the Advancement of Science and Art. New York, N. Y.

JACKSON CITIZEN PATRIOT

X-TG140

JACKSON, MICHIGAN, SUNDAY, JULY 22, 1956.

5,650,000 Freight Car Lengths of Wire

Statistics of Straits Span Astronomical

St. Ignace - (AP) - Steel wire, the combined length of 5,650,000 freight cars, will hold the Straits of Mackinac bridge suspension over the choppy juncture of Lakes Michigan and Huron.

These was just one of the enormous statistics released Saturday by David B. Steinman, consulting engineer for the bridge.

Here are some others:

The total amount of steel and concrete in the bridge structure is more than one million tons. Three quarters of this terrific weight is under water.

4,851,700 RIVETS.

The steel towers and spans are put together with 4,851,700 steel rivets, 1,016,600 high tension bolts.

The cable wire is only one fifth of an inch in diameter—something like the lead in a pencil. This wire, bound into cables, would safely hold the entire weight of the bridge if it were held from someplace in the sky.

Of course, Steinman explains, there's an awful lot of the wire that goes into making the cable. He said the length would make an awfully long freight train or, put differently, be the length of 180,000 empire state buildings laid end to end.

The cables, which span 8,000 feet, from anchorage to anchorage are 24 1-2 inches in diameter. They are made up of 37 strands of 348 wires each.

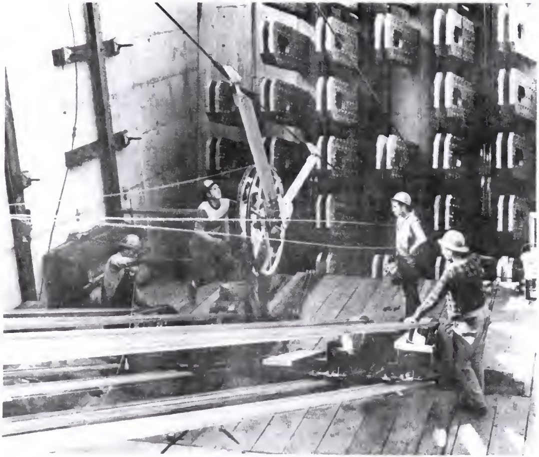
SOME MORE.

If this doesn't overwhelm you, try these:

Some 7,080,000 man hours, excluding quarry, mine, shop, mill and transportation, will go into putting the one million ton structure together. Some 250 engineers have put in 1,400,000 man hours of engineering, much of it highly specialized, on calculations, design, surveys, inspection and supervision.

This, Mr. Steinman says, is in addition to the engineering by the several contractors on the job which is also considerable. Total engineering on the project will exceed two million man hours.

This is what goes into building the longest suspension bridge in the world, so keep your old China wall.



SPINNING WHEEL STARTS ACROSS— Spinning cables at St. Ignace for Michigan's Mackinac bridge gained momentum last week as workmen began placing some of the 12,876 wires which will form each of the bridge's 24 1-2 inch diameter supporting cables. In this photo the spinning wheel is starting its trip across the bridge span carrying two loops (four wires) with it. The wheel is pulled across the span by an endless 18,500-foot-long wire rope. In the background are some of the anchor bars which will transmit the 30,000-ton pull of the cables to the anchorage piers. (AP Wirephoto to the Citizen Patriot.)

O projeto da ponte Mackinac sob o ponto de vista da estabilidade aerodinâmica

DR. D. B. STEINMAN
Engenheiro Consultor
New York

Tradução
AMÁLIA e O. MACHADO DA COSTA

Separata da revista "ENGENHARIA", N.º 162, maio de 1956

LOYOLA NEWS

Vol. XXXVI, No. 5 Chicago, Illinois Thursday, Oct. 25, 1956

Famed Poets To Speak Here

Plan 5 Talks by Celebrated Group

BY JOSEPH MARREN

Poets Dame Edith Sitwell, E. E. Cummings, Robert Frost, Karl Shapiro, and Allen Tate are each expected to conduct one of a series of five lectures here at Loyola. The arrangements are being made by the Rev. Norman T. Weyand, S.J., chairman of the English Department.

On his recent trip to New York Father Weyand interviewed David B. Steinman (*Readers Digest*, October, 1956, "Master Bridge Builder") in the hope of having him sponsor such a poet lecture series. Within a week Dr. Steinman answered with a donation of three thousand dollars.

Begin in December

The lectures, which are scheduled tentatively to begin in December, will be held on the thirteenth floor in the ballroom at Lewis Towers. They will be free and open to the public as well as to students.

The recipient of honorary doctoral degrees from Leeds, Durham and Oxford, Dame Grand Cross of the Order of the British Empire, Edith Sitwell (title conferred by Queen Elizabeth II in 1954); E. E. Cummings, painter, poet-innovator; and Robert Frost, four time winner of the Pulitzer Prize, who was also commended on his seventy-fifth birthday in 1950 by unanimous resolution of the United States Senate — these require no introduction; all are currently prominent poets.

Former LU Prof

Karl Jay Shapiro will be remembered at Loyola for having conducted the poetry workshop here in 1950 and 1951, while he was in Chicago as editor of *Poetry* magazine. Since leaving Loyola he has, among other places, lectured at the Salzburg Seminar in American Studies and has studied in Europe on a Guggenheimer Fellowship. In 1945 he received the Pulitzer Prize for *V-Letter*, a book of verse edited, while he was in service, by his fiancee, Evelyn Katz, who is now his wife.

Tate, Poet and Critic

Allen Tate, one of the seven representatives at the International Exposition of the Arts in Paris in 1952, and in the same year member of the American delegation to the UNESCO Conference on the Arts in Venice, is well known both as poet and critic. From 1944 to 1947 he edited the *Sewanee Review*. He has held the Chair of Poetry at the Library of Congress, and has also been Fellow in American Letters there. He is presently professor of English at the University of Minnesota.

Also on the list for consideration are Richard Wilbur and John Crowe Ransom. Howard Moss in the September issue of *Poetry* magazine reviews Wilbur's *The Misanthrope*, a translation from Moliere, together with his latest book of verse, *Things of This World*. John Crowe Ransom, renowned as a critic, as well as an accomplished poet, has appeared in the *Kenyon Review*, which he has edited since 1939.

Reprinted from

THE EASTERN UNDERWRITER

Fire Fire

J. S. Frelinghuysen Corp. Places Big Line For Mackinac Bridge Authority

Involves All Risk Physical Damage Insurance on 34 Piers Connecting Upper and Lower Peninsulas of Mich.; 30 Amer. Cos. Underwrite Piers, Valued at $25 Million

On August 1, 1956, a little over two years after ground was broken, the 34 piers of the mighty Mackinac Straits Bridge connecting the upper peninsula of Michigan with the lower peninsula were accepted by the Mackinac Bridge Authority from the foundation contractors, Merritt-Chapman & Scott.

All risk physical damage insurance on

Left to right—Forrest A. Heath, vice president of J. S. Frelinghuysen Corp., delivers insurance binders to Prentiss M. Brown, chairman of Mackinac Bridge Authority; Dr. D. B. Steinman, consulting engineer and designer of Mackinac Straits Bridge, and Lawrence A. Rubin, secretary of the Authority.

the piers was placed by J. S. Frelinghuysen Corp., New York, leaders in this field of insurance activity, in behalf of the Authority. Thirty American insurance companies and their affiliates have underwritten the piers, valued at $25,000,000, on an 80% coinsurance basis, with a 2% deductible on each pier.

Forrest A. Heath Supervised Negotiations

The negotiations between the Authority and insurance underwriters have been supervised by Forrest A. Heath, vice president of J. S. Frelinghuysen Corp., who maintains offices in New York, New Jersey and Michigan. Mr. Heath commends the Authority for having selected an insurance broker in the early stages of activity, thereby giving ample opportunity for the broker to present facts pertaining to type of construction, geology, wind and other factors of interest to insurance underwriters for their careful study before participation commitments were needed.

In this case the broker helped write

118 feet above water level. Each anchorage pier is designed to stand not only the actual 30,000 tons pull at each end of the two cables, but will handle 5½ times that amount of pull.

A total of 88,000 tons of crushed rock—12 shiploads—were used in construction of each anchorage pier. Of the 440,000 cubic yards of cement used in foundation work 350,000 yards is under water. The new "Prepakt" method of mixing the cement [illegible] used. Dolomite from Drummond Island and limestone from Rogers City were the sources of rock materials. The completed bridge will weigh about 1,000,000 tons; three-quarters of that weight is under water.

Over 700 men have been employed in round the clock shifts, with millions of dollars in barges, derricks, boats and other equipment, making this one of the greatest assemblages of deep water construction equipment ever mobilized.

Dr. D. B. Steinman, consulting engineer and designer of the bridge, has stated that each pier has been designed to withstand five times the greatest amount of ice pressure ever calculated in laboratory or field. Laboratories have recorded 23,000 pounds of ice pressure per lineal foot and these piers have been designed to stand 115,000 pounds. As further safety against ice, each pier is protected by steel sheet piling, steel caissons and armor plate.

[illegible]

A Reader's Digest

REPRINT

Master Bridge-Builder

By Ira Wolfert

THE READER'S DIGEST • PLEASANTVILLE, NEW YORK

PROFESSIONAL ENGINEER

Official Publication of American Association of Engineers

This Gladness I Have Known

By D. B. Steinman

I have seen a bluebird on the wing,
Above a field in gold and scarlet hue;
A spray of apple blossoms in the spring
In dazzling light against a sky of blue.

I have known the joy of golden days,
A grassy bank, a stream in jeweled glow;
Then oak and maple leaves in autumn blaze,
And pines in winter, crowned with sunlit snow.

God, I thank Thee for the gift of light
And weep for those who dwell in endless night.

A Hobby Issue for Engineers

Vol. 40 (a Reprint) *No. 1*

Dr. D. B. STEINMAN
Ingegnere Consulente - New York

La stabilità aerodinamica del ponte di Mackinac

Estratto dalla rivista "ACCIAIO e COSTRUZIONI METALLICHE" *n. 2 - 1956*

Suspension Bridges:

The Aerodynamic Problem

and Its Solution

By D. B. STEINMAN
CONSULTING ENGINEER
NEW YORK, NEW YORK

Reprinted from Science in Progress, *Ninth Series, edited by George A. Baitsell, published by Yale University Press, New Haven, Connecticut.*

Cheboygan Observer

Cheboygan, Michigan, Thursday, April 12, 1956

EDITOR'S NOTE

The Mackinac Straits Bridge project has been described in poetry by Dr. D. B. Steinman, world famous engineer who designed the bridge.

THE BRIDGE AT MACKINAC*
By D. B. Steinman

In the land of Hiawatha,
Where the white man gazed with awe
At a paradise divided
By the Straits of Mackinac—

Men are dredging, drilling, blasting,
Battling tides around the clock,
Through the depths of icy water,
Driving caissons down to rock.

Fleets of freighters bring their cargoes
From the forges and the kilns;
Stone and steel — ten thousand barge loads —
From the quarries, mines and mills.

Now the towers, mounting skyward,
Reach the heights of airy space.
Hear the rivet-hammers ringing,
Joining steel in strength and grace.

High above the swirling currents,
Parabolic strands are strung;
From the cables, packed with power,
Wonder-spans of steel are hung.

Generations dreamed the crossing;
Doubters shook their heads in scorn.
Brave men vowed that they would build it —
From their faith a bridge was born.

There it spans the miles of water,
Speeding millions on their way;
Bridge of vision, hope and courage,
Portal to a brighter day.

*—Pronounced "Mackinaw".

REPRINTED FROM

ENGINEERING NEWS-RECORD

AUGUST 9, 1956

Erection Speed Governs Hudson Bridge

CIVIL ENGINEERING

JULY 1956
VOL. 26 • NO. 7

THE MAGAZINE OF ENGINEERED CONSTRUCTION

Reconstructed Brooklyn Bridge Receives Award

Brooklyn Bridge—designed by John A. Roebling in the days of horse-and-buggy traffic and reconstructed, 1950–1953, with wider roadways for modern highway traffic—has been honored by the American Institute of Steel Construction with a special artistic bridge award. Reconstructed by the city from the plans and design of D. B. Steinman, M. ASCE, New York consultant and bridge authority, the structure was cited as "a preeminent example of the adaptability of the steel bridge" to expanding traffic needs.

This newest tribute to the bridge is recorded on a large stainless steel plaque mounted on the Manhattan tower for lovers of "the Bridge" to see on their strolls across the famous elevated promenade. The tablet was unveiled on May 24, seventy-third anniversary of the opening of the bridge, by F. W. Roebling, 3rd, great-grandson of the original designer.

CONSTRUCTION

THE MASTER BUILDERS' WEEKLY

BEING THE OFFICIAL ORGAN OF THE MASTER BUILDERS' ASSOCIATION OF N.S.W., AFFILIATED BRANCHES, AND THE BUILDERS' EXCHANGE OF N.S.W.

APRIL 18, 1956.

BOOK REVIEW

"I Built a Bridge and other Poems," by Dr. David B. Steinman, Ph.D., B.E., C.E. Davison Press, N.Y., 1955. Limited edition, 2 dollars, U.S.A.

This small book is a collection of twenty-five poems written by the famous bridge builder, David B. Steinman, formerly Professor of Civil Engineering at Idaho University, and since 1920, Consulting Engineer. He has been responsible for many notable bridges on five continents and was awarded the Norman Medal on two occasions; the highest award of the American Society of Civil Engineers.

Dr. Steinman is the author of several standard works on bridge design and construction. It is not surprising that a brilliant engineer should find expression in verse, for to be a good engineer one must have the gift of artistic expression. Engineering is essentially an art. Others, like the late Professor Albert Einstein, found their outlet in music, his violin was his medium.

The verses of Dr. Steinman express the vigorous mind of a man of action. They are characteristic of the man who has achieved something. His philosophy is coloured with the same outlook. Poems from this collection have appeared from time to time in the pages of the "Australasian Engineer," as well as descriptions of his bridge achievements.

The book is a gem. It can be picked up at any moment when stimulating thought is needed to stir the jaded mind. Typical of the verses, the following will also serve as a seasonal message at the close of the current year

"A Bridge of Peace"

In human heart was born the plan:
A bridge of peace, uniting man.
Our sons will have the span we wrought:
The world the dream for which we fought.

Professional

ENGINEERS NEWS

MAY, 1956

OLD WHEELING SUSPENSION BRIDGE WILL GET GENERAL OVERHAUL SHORTLY AFTER MEMORIAL CEREMONY

D. B. Steinman

Dr. D. B. Steinman was the principal speaker on Sunday afternoon, May 20, 1956 at the ceremonies when the Wheeling Suspension Bridge was dedicated into a national memorial to John A. Roebling and to engineers generally.

The bridge was designed and built by John A. Roebling. It was completed in 1856 and was the first bridge to span the Ohio River. When completed it was the longest suspension span in the world and is now, in its 100th Anniversary Year, the oldest existing suspension bridge.

No man is better qualified today than Dr. Steinman to honor John A. Roebling and the old Wheeling Suspension Bridge. Steinman is one of the world's foremost authorities on suspension bridges as well as on the life and work of John A. Roebling. In fact it was his close proximity to the Brooklyn Bridge. during his childhood, that inspired him to become a bridge builder and authority on the life of John A. Roebling, the designer and builder of the Brooklyn Bridge. So intertwined is Steinman's life with that of John A. Roebling that his offices located in the Roebling Building, 117 Liberty Street, New York, are in the shadow of the Brooklyn Bridge.

Dr. Steinman's life is replete with great works and great honors.

An internationally eminent bridge engineer, he received his B. S. degree (summa cum laude) at the City College and his C. E., A. M., and Ph. D. degrees at Columbia University. He was Professor of Civil Engineering at the University of Idaho from 1910-14, and Professor of Civil and Mechanical Engineering at the City College from 1917-20. Since 1920, he has been in private practice and has served as designing or consulting engineer in the construction of many notable bridges on five continents. Eight of his bridges have been honored in the annual awards for the most beautiful bridges in America. He has received numerous honors, both national and international, for distinguished achievements. He has twice received the Norman Medal, the highest award of the American Society of Civil Engineers, in addition to two other awards of the Society. In 1932 he was presented with a silver scroll by eleven engineering societies for his outstanding contributions to the advance-

JACKSON CITIZEN PATRIOT

JACKSON, MICHIGAN, FRIDAY, MAY 11, 1956.

U-M Honors Designer of Straits Span

Ann Arbor - (AP) - David B. Steinman, designer of and consulting engineer for the Straits of Mackinac bridge, told the University of Michigan's honor students Friday that "spiritual ideals" are "an absolute necessity" in the atomic age.

Speaking at the honors convocation, where he received an honorary doctorate of engineering, he said spiritual ideals have ceased to be a luxury.

He said that communism's economic and political theories were not the main threat to the west. He said:

"In the final analysis, our fears are engendered by the essential immorality of the Soviet system—by its open renunciation of truth, justice, kindness and the other values we cherish."

"In this time of fear, fatigue and frustration," he said, "our only invulnerable armor is a genuine spiritual faith and courage."

Now, even science and theology are getting closer together, Steinman said. "Scientists are discovering that the universe contains imponderables beyond the reach of the test tube, formulas and slide rules."

JOURNAL

Florida Engineering Society

FOUNDED 1916

F E S

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

VOL. X NO. I

June, 1956

EL MERCURIO
FUNDADO POR AGUSTIN EDWARDS
Santiago, 3 de Mayo de 1956

Puente Monumental en el Estrecho de Messina

Un gran proyecto resolverá después de siglos el problema muy viejo y siempre nuevo de la unión física y estable de la Isla de Sicilia con la Italia continental, para satisfacer el movimiento de mercaderías y pasajeros que ha llegado a cifras cercanas a los 300.000 vagones de F. C. y 500.000 pasajeros al año, que deben atravesar el Estrecho por el lento y precario sistema de los Ferry-Boats, sujeto además a las enormes dificultades de una zona de clima violento.

Convencido el Gobierno de Italia de la importancia de una solución definitiva de este grave problema, llamó a un concurso internacional de ingenieros que lo informarán de la posibilidad de una obra de tal importancia, en aprovechamiento de los adelantos en la ciencia, de la práctica y de los elementos y equipos de construcción con que ahora se cuenta. Y en este concurso obtuvo el primer lugar el ingeniero consultor Dr. David B Steinman, de 117 Liberty Street New York 6, N. Y., quien fué luego contratado por el Gobierno para el estudio del proyecto definitivo y presupuesto de costo, sobre la base de un puente colgante que diera cabida a dos líneas de F. C. y a una calzada carrozable para todo tipo y peso de vehículos motorizados, tanto como que permitiera el tráfico marítimo intenso de barcos de todo tamaño que atraviesan el canal.

El puente proyectado cuenta con un tramo central de 5.000 pies de luz y a 150 pies de altura sobre el agua, y con dos tramos laterales de 2.400 pies, totalizando la distancia de 9.800 pies de ribera a ribera, entre la Isla y el Continente, aparte de los accesos en tierra firme, cuyo costo es estimado por el autor en 60 millones de dólares, que podrían cubrirse con un empréstito avalado por el Gobierno y servido por medio de un discreto peaje para lograr su amortización en no más de veinte años.

El ingeniero Dr. Steinman ha debido salvar en su proyecto las más grandes dificultades profesionales que nunca antes se hayan presentado en un proyecto de puente colgante, por la profundidad del mar en el canal superior a 400 pies para la fundación de las dos torres principales de apoyo del tramo central y de los cables de suspensión en armaduras de acero de 550 pies de alto sobre el agua, tanto como por el duro clima de zona, las tempestades con vientos huracanados de 100 millas por hora, las correntadas producidas por las mareas en la estrechez del canal y hasta por los temblores y terremotos originados por la actividad de los vecinos volcanes, el Stromboli y el Etna.

Cualquier día el progresista Gobierno de la Italia Eterna dará curso a esta colosal muestra de la ciencia y el arte de la ingeniería, en provecho de los intereses nacionales y en beneficio de las buenas comunicaciones en este mundo tan lleno de intranquilidades y amarguras, que a pesar de todo sigue siendo capaz de marchar hacia adelante.

R. Torretti.

The METHODIST MESSENGER

Volume 6 — No. 1 Published by the St. Ignace Methodist Church, St. Ignace, Michigan June, 1956

THE FAITH OF A BRIDGEBUILDER

I am proud to be an Engineer—a builder of bridges. I like to think of bridges as links joining man to man. And I like to think of religion as a link joining man to God.

In my youth I hoped and dreamed and prayed for a chance to go to college and to become a builder of bridges. In the background of my boyhood, that high ambition seemed desperately impossible of attainment. But God was good to me. With seeming miracle after miracle, the way was opened to me and all of the prayers and hopes and aspirations of my early years have come to fulfillment beyond my dreams.

To me, life has been a succession of inspiring influences, of impelling ambitions, of obstacles overcome, and of dreams come true. The realization—one after another—of dreams that seemed hopeless, leaves me reverent and humble.

As we span the years, we find that life is a bridge—a bridge of faith and hope and aspiration—a bridge of friendship and loyalty and love—a bridge from man to God.

If you ask me what religion means to me, my answer is very simple. To me, religion means **the consciousness of God**—the consciousness of His presence, of His inspiration, of His divine love.

To me, that is the essence of all religion—the awareness of God, in our lives, in our works, and in the sublime wonders and beauty of the world around us. We are God's journeymen, privileged to be His co-workers in the task of making the world even more beautiful than we found it. With God in our lives, we are His partners—continuing the work of Creation.

In every dedicated work of man, whether it be an humble labor or an inspired achievement, we are doing God's work. In the planting of a flower, a tree, or a wheat field; in the building of an airplane, a bridge, or a cathedral; in the writing of a poem, a song, or a glorious symphony; in whatever we do with a spirit of dedication; whenever we cooperate with divine forces or draw upon powers beyond ourselves—we are working in partnership with God.

Life is meaningless unless we are conscious of a purpose and a plan. We are placed here and we are given all the blessings of life and talent and inspiration, in order that we may work in partnership with God in advancing His sublime plan—to make mankind nobler and to make the world more beautiful.

In my youth, I became inspired with the dream of creating beautiful bridges. I visited existing bridges, and climbed over and under them, and studied them from every angle—in order to crystallize my own thoughts as to why some structures were ugly and depressing whereas others produced a thrill of artistic delight. The answer was not given in our textbooks. In my later years, I found the reason why so many structures were unsightly and awkward—simply because it is easier for the designer to turn out a commonplace design. It does not cost any more to build a beautiful span, but it requires a little more dedicated effort on the part of the designer. That is the something **plus** that we can put into our work. To a thorough understanding of structural design and function, the designer must add a strong inner feeling for beauty. He must find this within him. I like to think that this inner prompting is God's part in our work.

When people ask me why I consider it so important to make bridges beautiful, my answer is very simple. I say, **"God made the world beautiful.** We have no right to mar it and deface it with works of ugliness. The structures we plan and build must delight the eye and lift the heart. We hold a sacred trust and privilege—to be God's co-workers, reverently carrying out His plan. We are entrusted with His inspiration to create in beauty. Only by making our works beautiful can we keep the faith."

The great master builders who preceded us dreamed their dreams and wrought their dreams—giving health, strength, and even life itself, as the price for achievement. Profiting by our heritage from the pioneers, we are tackling even greater tasks. Whatever we may accomplish will in turn be eclipsed by those who follow after us.

In whatever we do—in whatever we build—beyond the stone and the steel, the calculations and the plans—the one priceless ingredient is the spirit of consecration. That includes the qualities of vision, devotion, inspiration and integrity.

When our lives are dedicated and our work is consecrated, then we are truly working with and for God—to make life more beautiful and more glorious for our fellow men and for those who come after us.

—By D. B. STEINMAN, Bridge Eng.

THE West Virginia Engineer

VOLUME 18 JUNE, 1956 NUMBER 6

Dedication of the Wheeling Suspension Bridge as a National Monument

By D. B. STEINMAN

This is an historic occasion. Today we are gathered here to dedicate a famous pioneer structure — the oldest cable supension highway bridge in the world — as a national monument. Because this span has played a dramatic and significant role in the development of bridge engineering, and because its outstanding record of more than a century of distinguished service is interwoven with the unfolding panorama of American history, it is altogether fitting and proper that the century-old Wheeling Suspension Bridge should be preserved as a national shrine to thrill and inspire future generations.

When this great structure — the first bridge over the Ohio River — was completed in 1849, it was a truly notable achievement. Its span of 1,010 feet was by far the longest in the world, the first time human courage and resourcefulness had achieved a span exceeding 1,000 feet.

The story of the Wheeling Suspension Bridge is linked with the names of two pioneer bridgebuilders who made suspension bridge history — Charles Ellet, Jr., of Philadelphia, and John A. Roebling of Pittsburg. The two men, although both were characterized by native genius and creative courage, were of contrasting types and temperaments.

Charles Ellet, Jr., born in 1810 at Penn's Manor, a village near Philadelphia, was of the salesman type — a promoter rather than an engineer. With little more than a grammar-school education and with no formal engineering education, Ellet was brilliant, unhesitating, and a master of salesmanship. Through his initiative and personality, and by the boldness and originality of his proposals he posed as an experienced bridgebuilder and achieved a newspaper reputation as a famous bridge engineer — before he had built a single span.

John August Roebling, born in 1806 in Mulhausen in Thuringia, revealed unusual endowments and qualities from boyhood — quick intelligence, nervous energy, and an active brain. Through the sacrifices and vision of his mother, he received the finest engineering and architectural education at the Royal Polytechnic Institute. During his student years, he visited a small chain bridge then under construction in Bavaria — the first suspension bridge in his part of the world. That experience fired his imagination and crystallized his ambition. He was going to be a builder of suspension bridges, and he was going to build them better and larger and stronger than any previously conceived. Finding his ambition stifled under an autocratic regime, Roebling left his homeland and came to America in 1831, seeking freedom to work, to build, to achieve.

During the ensuing years, the paths of the two young men, Ellet and Roebling, crossed and recrossed. In 1841 the Pennsylvania newspapers heralded Ellet's proposal to build a suspension span across the Schuylkill River at Fairmount in Philadelphia. Roebling, then engaged in engineering work at the opposite end of the state, near Pittsburgh, was excited by the announcement that the proposed Fairmount span was to be a wire suspension. Although Ellet was actually the younger of the two by four years, Roebling naturally assumed that the proposed builder of the Fairmount Bridge was the older and more experienced engineer. He anxiously wrote to Ellet, soliciting an opportunity to serve as an assistant; but he was rebuffed. Ellet built the Fairmount Bridge in 1841, and Roebling was brokenhearted.

Ellet — audacious, brilliant, cocksure — was to have the earlier start; but his success, like his work, lacked the sound foundation needed to make it stable and enduring.

In 1841, Roebling made his historic invention of wire rope, and proceeded to develop his method of building suspension bridge cables — the air-stringing method still in use in the largest modern suspension bridges. By 1850, John Roebling had realized his ambition — he had become a builder of suspension bridges. Six of them he had built in six years. Six suspension structures successfully completed! No other bridgebuilder of the time could point to such a record. The erstwhile immigrant and farmer had become the world's foremost exponent of a new art of bridge construction.

In the meantime, in 1847,* a company had been formed to build a toll span over the Ohio River at Wheeling. Ellet and Roebling, both described in the local press as "young engineers of ability," submitted proposals for the construction of the bridge. Ellet advocated a single, long span of the record-breaking length of 1,010 feet from bank to bank; and Roebling, in view of the narrow width of the structure, urged a central span not to exceed 600 feet, flanked by side spans and stiffened by inclined stays. The decision was left to the local board of directors, a group of businessmen who knew little or nothing about bridge design. A vote was taken, with the result that Ellet's plan was approved and he was given the job. The span was light and narrow for its length, carrying only a 17-foot wagon way and a $3\frac{1}{2}$-foot sidewalk. Most important of all, the span had no stiffening truss.

Again Ellet had his hour of glory. Completed in 1849, the Wheeling Bridge was his crowning work. He had built just two bridges, one in 1841, the other

MICHIGAN CONTRACTOR and BUILDER

DETROIT, MICHIGAN, JUNE 2, 1956

University of Michigan Honors Bridgebuilder

David B. Steinman, engineer of the Mackinac Bridge, received the honorary degree of Doctor of Engineering from the University of Michigan at the Honors Convocation in Hill Auditorium. Dr. Steinman was the University's speaker at the Convocation, his subject being "The Spiritual Challenge of the Atomic Age". The honor was conferred by President Harlan Hatcher upon the bridgebuilder following his address, by authorization of the Regents of the University and on recommendation of the faculty.

Dr. Steinman's participation in the Honors Convocation came in the midst of a heavy schedule of speaking engagements. He gave his famous illustrated talk on "The Mackinac Bridge—Conquering the Impossible" at Manhattan College in New York on Wednesday evening (May 9th), and before the Student Engineering Societies of the University of Michigan on Thursday evening (May 10th); and before the Ann Arbor Realty Board and the Ann Arbor Chamber of Commerce on Friday evening (May 11th), and before the Sault Ste. Marie Rotary Club on Monday noon (May 14th), following two days at the bridge site at Mackinac Straits. He gave the Mackinac Bridge talk before the Industrial Mathematics Society and the local section of the American Society of Civil Engineers at Detroit on April 24, and before the annual convention of the Florida Engineering Society at West Palm Beach on April 28. On May 20 he was the principal speaker at the dedication of the century-old Wheeling Suspension Bridge at Wheeling, West Virginia, and on May 25 he presented a paper on "How the Mackinac Bridge Was Designed for Aerodynamic Stability" before the annual convention of the Engineering Institute of Canada at Montreal. On May 26 he was at the bridge site at St. Ignace to participate in the press conference and to attend a meeting of the Mackinac Bridge Authority.

On June 3 Dr. Steinman receives the honorary degree of Doctor of Science at Bradley University at Peoria, Illinois. This will bring his total number of academic degrees to nineteen, including four earned and fifteen honorary.

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Le centenaire du pont suspendu de Wheeling, sur l'Ohio (É.-U.).

Une cérémonie a été organisée, le 20 mai, pour célébrer le centenaire d'un ouvrage important, le grand pont de Wheeling sur l'Ohio, ouvrage qui a fait époque dans l'art de la construction des ponts suspendus, et qui est considéré à ce point de vue comme monument national aux États-Unis.

A cette cérémonie, M. D. B. Steinman a prononcé une intéressante allocution au cours de laquelle il a fait l'historique du pont. Les noms de deux constructeurs sont attachés — avec un mérite inégal — à ce bel ouvrage. Le premier, Charles Ellet, né en 1810 près de Philadelphie, était plutôt un homme d'affaires qu'un technicien ; avec une instruction ne dépassant pas le niveau de la « grammer-school » mais des qualités de hardiesse et d'initiative, il avait acquis une réputation de fameux ingénieur en matière de pont avant d'avoir construit une seule travée. En 1841, il construit un pont suspendu sur la Schuylkill, à Fairmount, pour lequel Rœbling lui avait offert sans succès sa collaboration.

J. A. Rœbling était né en 1806 en Thuringe, à Mulhausen. D'une intelligence prompte, possédant de grandes aptitudes scientifiques, il fit des études techniques approfondies à l'Institut royal Polytechnique de Bavière et se sentit attiré par la construction des ponts, principalement des ouvrages suspendus. En 1831, il quittait son pays pour s'établir aux États-Unis.

En 1841 il fit une invention d'une grande importance pour l'avenir de la construction des ponts suspendus : celle de la fabrication sur place des câbles, entre les pylônes, procédé encore utilisé de nos jours. Il devint bientôt l'un des grands constructeurs de l'Amérique : de 1844 à 1850, il édifia six ponts suspendus.

En 1847, une compagnie avait projeté la construction d'un pont à péage sur l'Ohio à Wheeling. Ellet et Rœbling soumirent chacun un projet. Celui d'Ellet comportait une travée suspendue de 1 010 pieds (307,85 m). Tenant compte de la faible largeur de l'ouvrage, 7,30 m, Rœbling avait prévu une travée médiane de 600 pieds (183 m) seulement, entre deux travées d'approche ; des barres inclinées raidissaient la travée.

Le projet d'Ellet fut cependant choisi, ce fut le second et le dernier ouvrage qu'il construisit. Achevé en 1849, il s'écroula en 1854.

A cette époque, Rœbling était occupé à la construction du pont suspendu portant une voie ferrée sur le Niagara, ouvrage exceptionnel, qui fit époque. Il avait déjà conçu la nécessité de poutres de raidissage et de tirants obliques pour permettre aux ponts suspendus de résister aux efforts du vent. On fit appel naturellement à lui pour la reconstruction de l'ouvrage et le nouveau pont de Wheeling, édifié d'après ses premiers plans, fut achevé en 1856, pour la somme de 42 000 dollars. Il reste, après cent ans, un exemple d'une saine et savante technique, qui a servi d'enseignement à plusieurs générations d'ingénieurs.

BAY CITY TIMES

BAY CITY, MICHIGAN, TUESDAY, JULY 3, 1956 X-TG 140
.S8

Bridge Designer Wins Poetry Post

Special to The Times

ST. IGNACE, Mich. — Dr. D. B. Steinman, designer and chief engineer of the Mackinac bridge, has been elected a trustee of the Poetry Society of America, Steinman's office said today.

Steinman has been writing poetry as a hobby for several years and more than 120 of his poems have been published. Recently his first volume of collected verse was published under the title "I Built a Bridge and Other Poems."

Steinman also is a member of the Catholic Poetry Society and the Poetry Society of Michigan.

Columbia Report

VOLUME X, NUMBER 1 · A Quarterly of Columbia University · APRIL, 1956

David B. Steinman, the noted bridge engineer, has established a $10,000 "debt of honor" scholarship to help students at Engineering. In 1909 Dr. Steinman received his degree from the school, helped by $650 in scholarships. To date, he has given $65,000 to Columbia, repayment exactly one-hundred-fold. Dr. Steinman has designed the Henry Hudson Bridge, the Thousand Islands Bridge, the proposed Messina Straits Bridge and many others throughout the world. Six of them have been honored in annual awards as the most beautiful in America.

New York Construction News
Grand Central Terminal Building New York 17, N. Y.
Vol. III, No. 44 New York - New Jersey Metropolitan Area Monday, May 28, 1956

Steel Institute Cites 'The Bridge' With Plaque

That noble old lady—Brooklyn Bridge — celebrated by generations of poets and painters and enjoying boundless popular affection, has won another distinction. It's less romantic than the garlands of adjectives and bouquets of gorgeous similes which have borne testimony to her beauty, but her new distinction gives her the indispensable diploma she needed to put those Johnnies-come-lately — the George Washington, Triborough and the Whitestone Bridges—in their proper places.

Appraised by the pragmatic eyes of the American Institute of Steel Construction, Brooklyn Bridge has won the accolade of being a "preeminent example of the adaptability of the steel bridge" to modern traffic needs.

BROOKLYN BRIDGE, which has carried pigs, goats, cows, cable cars, trolley cars and elevated trains of a bygone age, is being commended for "its present efficient usefulness."

This latest tribute to her steadfast strength and her accommodations to the motor age is suitably engraved on a stainless steel plaque (30"x36" for those who care to know) and set up for lovers of the Bridge to see on their strolls across the famous pedestrian walk.

Six anchor bolts, with polished stainless steel heads, driven into the massive granite of the Brooklyn side of the Manhattan tower will hold the plaque in place.

It was unveiled at a ceremony at noon, Thursday, May 24, the 73rd anniversary of the opening of the Bridge, by F. W. Roebling, 3rd, great-grandson of John A. Roebling, designer of the Bridge.

The Huntington Herald-Press

HUNTINGTON, INDIANA, SUNDAY MORNING, MAY 27, 1956

'Strength of Gibraltar'

Engineer Says Michigan Bridge Firmly Implanted in Bed Rock

ST. IGNACE, Mich., May 26 (UP) — The engineer who designed the Mackinac Straits bridge said today the span's foundations are so firmly implanted in solid bed rock that nothing's going to give.

Dr. David B. Steinman said a two-year geological study of the bottom of the straits "assured the safety" of the bridge which will link Michigan's lower and upper peninsulas in November, 1957.

Steinman was principal speaker at the Mackinac bridge "press day," held in conjunction with the closing of Michigan week.

Newsmen found the bridge's two skyscraper main towers, each as high as a 46-story building, already were joined by the first of 10 wire cables to be strung between them.

Steinman said the geological study proved conclusively the truth of his earlier statements that the bridge will have "the strength of Gibraltar."

He said the bed rock on which the supports are based "has many times the strength required to withstand the comparatively moderate foundation pressures to be imposed on the structure — even under the most adverse conditions of wind and ice."

The Mackinac bridge, expected to bring new economic life into the upper peninsula, will be the longest suspension bridge in the world when measured from anchorage to anchorage.

The 3,800-foot center span will be slightly shorter than that of San Francisco's Golden Gate bridge.

VÉRIFICATION DE LA STABILITÉ AÉRODYNAMIQUE DU PONT DE MACKINAC

PAR

Dr D. B. STEINMAN
Ingénieur-Conseil, New-York

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47, rue Montoyer et 3b, rue de la Science
BRUXELLES

Evening News

SAULT STE. MARIE, MICHIGAN WEDNESDAY, JULY 25, 1956

Why The Mackinac Bridge Is Big

By D. B. STEINMAN
Consulting Engineer

The total quantities of material and labor going into the world-famous Mackinac Bridge in Michigan challenge comparison. They constitute a measure of the magnitude and difficulty of the undertaking and the extremely high degree of safety built into the executed project.

The total amount of steel and concrete in the structure is more than one million tons. Three-quarters of this weight is under water, where it cannot be seen, in the massive foundations and bases of the piers and the anchorages. This invisible under-water tonnage of concrete and steel supplies the enduring massiveness, safety, and stability of the foundations and piers on which the superstructure rests.

Total Quantities

The actual quantities, in tons, are as follows:

Concrete	945,600
Structural Steel	61,000
Steel Cables	12,300
Total	1,018,900

In the steel towers and spans there are a total of 4,851,700 steel rivets plus 1,016,600 high-tension bolts, or a total of nearly six million rivets and bolts. In the two main towers alone, each containing 6,250 tons of structural steel and each 552 feet high, there are 1,340,000 rivets and 27,000 bolts. The high-tension bolts are more costly than rivets, but the steel contractors volunteered to substitute the high-tension bolts without extra charge, to avoid delay occasioned by the shortage of skilled riveters.

* * *

The cables, spanning over 8,000 feet from anchorage to anchorage, are 24½ inches in diameter. Each cable contains 37 strands of 348 wires each, or a total of 12,876 parallel steel wires per cable. These cable wires are four times the strength of structural steel. The strength of a single wire is 7,500 pounds, and the tensile strength of each cable is over 18,000 tons. Because each cable is a compact mass of high-strength steel (the strongest material known to bridge engineers), it is difficult to conceive their vast strength. To aid the reader in visualizing the strength of the cables, imagine one of the cables hung vertically from some imaginary adequate support: thus suspended, a single cable would safely sustain the total weight of the towers and spans of the suspension bridge (8,614 feet long); and the two cables, thus suspended, would safely sustain the weight of the towers and spans of the entire bridge (five miles long).

42,800 Miles

The cable wire is about one-fifth of an inch in diameter, or approximately the thickness of a lead pencil. The total length of wire in the two cables is over 225 million feet or 42,800 miles; this is equal in length to more than 180,000 Empire State Buildings laid end to end, or equal in length to an imaginary train made up of 5,650,000 freight cars.

* * *

The construction of the Mackinac Bridge has given employment to over 10,000 men in quarry, mine, shop, mill, office and field. On the actual construction in the field over 2,500 men have been employed. The maximum working force at any time on each division of the work has been or will be as follows:

Substructure	788 men
Superstructure	700 men
Cables	360 men
Paving and Approaches	440 men
Field Engineering	49 men
Miscellaneous	200 men
Total	2,537 men

The estimated total labor on the actual construction at the site (not including quarry, mine, shop, mill, and transportation) is estimated at 7,080,000 man-hours.

250 Engineers

On the calculations, design, surveys, inspection, and supervision of construction, over 250 engineers have been engaged (under the direction of the consulting engineer) in office and field. This represents over 1,400,000 man-hours of engineering, most of it being highly specialized. This is in addition to the engineering forces maintained by the several contractors, in drafting rooms and estimating departments, and in mill, shop, and field. The total engineering on this work, including the contractors organizations and the consulting engineers staff, may be estimated at well over 2,000,000 man-hours of engineering.

Under the inspiring leadership of the Bridge Authority, no effort has been spared to make the Mackinac Bridge the finest, safest, and most beautiful bridge that has ever been built.

Petoskey News-Review

PETOSKEY, MICHIGAN SATURDAY, JULY 14, 1956

Progress Report Reveals Status Of Straits Bridge

By D. B. Steinman, consulting engineer

EXCELLENT PROGRESS has been recorded to date on the construction of the world-famous Mackinac Bridge connecting the upper and lower peninsulas forming the state of Michigan. Commenced in the spring of 1954, the $100,000,000 bridge, five miles long, is scheduled for completion in 1957.

The contractors for the piers and foundations, Merritt-Chapman & Scott Corporation, completed the foundations in 1954 and 1955 and have now completed all concrete work scheduled for 1956. They now are working on the final finish of the surfaces of the piers. The upper tiers of the two monumental anchorages, above the level of the steelwork, must be deferred until the cables are erected, and are scheduled for completion in 1957.

The elevated cat-walks for cable spinning now have been strung over the towers from anchorage to anchorage, and the actual spinning of the two powerful cables, each 24½ inches in diameter, will start about July 16. The schedule calls for completion of the spinning and compacting of the cables in November. The preparation for the cable spinning was performed on a two-shift basis, six days a week, making use of all the daylight available. The actual cable spinning is scheduled with the crews working around the clock, three shifts, or 24 hours a day.

The erection of the steel truss spans in the south approach has proceeded from Pier 1 to Pier 7; and the erection of the steel truss spans in the north approach has proceeded from Pier 34 to Pier 30.

The current strike in the steel mills will not affect the progress on the job, unless the strike is of considerable duration. The American Bridge Division has the bulk of the cable wire already delivered, about 76 percent of total requirements; and there is enough steel on hand for the approaches to complete a total of six spans at the north approach and twelve spans at the south approach.

The contractors are giving utmost cooperation to the Bridge Authority and the engineers to meet the goal of completing the bridge in 1957. Each year saved is worth six million dollars in earnings of the bridge to meet bond interest and amortization.

THE **Baltimore Engineer**

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Letters to the Editor

DEAR SIR:

For many years I have been an interested reader of your publication, THE BALTIMORE ENGINEER. I have noted with particular interest in your June issue Helme Rogers' question about what engineering formulas used the value π^2; and in your July issue the interesting and informative reply by Herbert Dawkins.

Supplementing the foregoing, I am writing to bring to the attention of your readers the fact, of great practical importance at the present time, that all of the formulas I have established and constantly employ for the study of the aerodynamic stability of suspension bridges necessarily involve both π^2 and π^4. You will find these formulas in a long string of my publications on the subject. In particular I direct your attention to my paper "Rigidity and Aerodynamic Stability of Suspension Bridges" published by the American Society of Civil Engineers in the 1943 Proceedings and in the 1945 Transactions, in which my Equation 6 introduces π^2 and π^4 for calculating the rigidity K of suspension bridges and their natural frequency N, and all subsequent formulas for aerodynamic stability or instability involve these factors. Also my paper "Aerodynamic Theory of Bridge Oscillations" published by the American Society of Civil Engineers in 1949 Proceedings and in 1950 Transactions, in which you will find the same factors K and N involved in all formulas for aerodynamic stability or instability, and these in turn involve π^2 and π^4. Also my paper "Suspension Bridges: The Aerodynamic Problem and its Solution" presented before the A.A.A.S. in 1953 and published in *The American Scientist* for July, 1954, where the basic Equation 21 again involves both π^2 and π^4. Incidentally, the last two papers named brought me the respective highest awards of the American Society of Civil Engineers and the Scientific Research Society of America.

The equations and formulas in the foregoing papers I use regularly in my office in the computation and design of suspension bridges for aerodynamic stability. This, I believe, supplies a significant answer to the original question raised in your June issue as to whether any practical engineering formulas use the value π^2.

With all cordial regards,

Faithfully yours,

D. B. STEINMAN

Progress on the Mackinac Bridge

BY D. B. STEINMAN

Excellent progress has been recorded to date on the construction of the world-famous Mackinac Bridge connecting the Upper and Lower Peninsulas forming the State of Michigan. Commenced in the spring of 1954, the $100,000,000 bridge, five miles long, is scheduled for completion in 1957.

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ANALES

DEL INSTITUTO DE INGENIEROS DE CHILE

SAN MARTIN 352 — CASILLA 487 — SANTIAGO

Sucesor

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AÑO LXIX ● ABRIL - MAYO - JUNIO DE 1956 ● N.os 4-5-6

Comisión Editora: *Raúl Sáez (Pdte.), Rodrigo Flores.*

Ing. Roberto Torretti P.

El puente en avanzada construcción sobre el estrecho de Mackinac entre los lagos Hurón y Michigan en EE. UU.

Proyecto del Ingeniero Consulto Dr. David B. Steinman.

En satisfacción de deseos manifestados por el autor, hago en las líneas que siguen una suscinta relación de lo que es esta monumental obra de la Ingeniería moderna, comenzada en mediados del año 1954 y que en ya muy adelantada construcción, se espera terminar y entregar al tráfico en noviembre del año 1957.

El Estrecho de Mackinac, que separa los dos grandes Lagos Huron y Michigan en el Estado de este nombre, divide en dos Penínsulas al mismo; la Alta, con unas 16.000 millas cuadradas y la Baja, con algo como 46.000 millas cuadradas, siendo la primera un territorio agrícola y minero, de grandes bosques, mientras la segunda, industrial por excelencia, encierra la gran ciudad de Detroit, centro de grandes actividades de la industria pesada y del automóvil. En la alta, aparte de la minería del cobre de marcada importancia, los bosques, la caza y la pesca, tanto como el "camping", toman un enorme interés durante todo el año, con los sports de cada estación, que llevan un movimiento de vehículos de todas clases y tamaños, estimados en cerca de dos millones de unidades por año.

Actualmente, el tránsito entre ambas penínsulas se hace por medio de Ferry-Boats a través del Estrecho, en viajes que toman al menos una hora de una orilla a otra, y naturalmente con enormes dificultades estacionales por causa del tiempo frecuentemente tempestuoso, por el invierno helado que lo corta, por las demoras consiguientes a exceso de tráfico, que en ocasiones ha llegado a las 17 y más horas, en colas de más de 15 millas de largo.

Como consecuencia de todas estas dificultades, por casi tres cuartos de siglo se ha buscado una solución satisfactoria al problema, insinuándose a veces la idea de un puente, o de un túnel sumergido, sin llegar a materializarse por falta de preparación técnica, por falta de elementos mecánicos adecuados y no poco por falta de confianza en la posibilidad de financiar una obra de tal magnitud, hasta que en 1953 la Legislatura del Estado creó una Autoridad del Puente de Mackinac, después de un informe favorable sobre las posibilidades de todo orden, de una

CATHEDRAL

By D. B. STEINMAN

From vaulted depths the towers rise and soar
In pinnacles and spires that pierce the blue;
So may men glimpse, in Gothic tracery,
Their prayer ascending to the infinite.

With upward gaze the heart attuned beholds
Imponderables carved in quarried stone,
While stained-glass radiance pours sacrament
On faith proclaimed aloft in ringing chimes.

In reverence the builders here have wrought
An affirmation of the spirit's quest;
An aspiration rendered visible—
The mortal thirst for immortality.

Reprinted from the June 1956 issue of
PARTNERS, The Magazine of Labor and Management

X-TG140

JULY
1956

STEINMAN, DAVID B., New York Alpha '06

Internationally noted bridge engineer with offices in New York, has had two new decorations conferred upon him: honorary membership in the Academie Universelle (Paris), and diploma and gold medal of the Associazione di Cultura Letteraris e Scientifica (Genova).

THE SONG OF THE BRIDGE

With hammer-clang on steel and rock
 I sing the song of men who build.
With strength defying storm and shock
 I sing a hymn of dreams fulfilled.

I lift my span above the tide
 And stand where wind and wave caress.
I bear the load so men may ride
 On rainbow road to happiness

The light gleams on my strands and bars
 In glory when the sun goes down.
I lift a net to hold the stars
 And wear the sunset as my crown.

DAVID B. STEINMAN, *New York Alpha '06*

HI, DOC!

The University of Cincinnati awarded honorary degrees at special ceremonies on April 19 to nationally prominent men. Frederick L. Hovde, Minnesota Alpha '29, received the degree of doctor of humane letters, and Walter C. Beckjord, Minnesota Alpha '09, was the recipient of the doctor of engineering degree. Dr. Hovde is president of Purdue University, and Dr. Beckjord is president of the Cincinnati Gas & Electric Co.

James B. Fisk, Massachusetts Beta '31, was awarded the honorary doctor of science degree by the Carnegie Institute of Technology. He is executive vice president of the Bell Telephone Laboratories.

At the commencement convocation of Bradley University in June, David B. Steinman, New York Alpha '06, received the honorary degree of doctor of science. Dr. Steinman has built over 300 bridges on five continents, and is now engaged on the construction of the Mackinac bridge connecting the upper and lower peninsulas of Michigan.

The honorary degree of doctor of science was conferred on Lewis M. Smith, Alabama Beta '16, by the University of Alabama on May 27. He is president of the Alabama Power Company, Birmingham, Ala.

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Volume XLVII

Number 3

BOOK REVIEW

I BUILT A BRIDGE AND OTHER POEMS. By David B. Steinman. The Davidson Press, 227 E. 45th Street, New York 17. 38 pp. $2.00.

SCIMITAR AND SONG has done another lovely thing for me. It has brought this book into my hands. A book whose lines are as strong and true as the lines of the bridges this great engineer has designed in both hemispheres.

How helpless I have felt when my four-year-old grandson, who has a dream of building bridges, brought his problems to me. He has especially sought information as to just how the great spans were built across the islands to the mainland on the Cooper River Bridge at Charleston. Finally I told him, "Lura lives in a paper world and in a plant world. She really does not know how bridges are built except that exactly the right part must be fitted in exactly the right way at the right time by men with great courage and skill who know how to take telling and to work together."

Today he said, "I put your mail on your table. There is one piece with a bridge on it." Of all the mail, the jacket design on the envelope covering Dr. Steinman's book registered with him.

I immediately read the book and I saw I was not too far afield when I told him what I knew of bridges. Dr. Steinman has written his poems like that. They are traditional without the dullness and error of much traditional verse. A lifetime of study, observation and of genuine search for truth has enabled this writer to put the right word at the right place at the right time. When this is done by one who recognizes the great cosmic plan of the Creator, traditional verse looms as far above the stark, crude modern poetry as the towering spans of steel lattice work of the Brooklyn Bridge loom above the slimy, snake-covered log thrown across a muddy creek.

"A Dream, A Song, A Prayer" is a powerful and beautiful poem expressing the author's formula for bridge building.

The lines from the title poem reveal the spirit of the man:

> I built a bridge across the years
> To win tranquility;
> I did not know how beautiful
> The last of life could be.
>
> I built a bridge across the dark
> To touch the shores of light,
> And faith it was that sped me on,
> And love that gave me sight.

Beaver Valley Times

"Beaver County's HOMETOWN Daily Newspaper."

Friday, October 5, 1956

Over 65

Presented By Pennsylvania Medical Society

By D. B. STEINMAN

My feeling upon reaching the crowning years of life are expressed in these lines from one of my poems:

I built a bridge across the years
To reach tranquility;
I did not know how beautiful
The last of life could be.

For a full life, these things are required: a goal and work that you love in line with the goal and hobbies for leisure hours. In addition to the continuing fascination of my lifework as a bridgebuilder, I find inspiration in new avocations and hobbies including music, poetry, mathematics, gardening, and bird study.

As to energy—with advancing years, we have to learn to husband our energy and to avoid needless drain upon our strength and time. We have to subjugate the alarm clock, the telephone and the engagement calendar.

Where I used to respond to requests for 20 professional papers or inspirational articles, I now concentrate my talents on a single article and arrange to have it published in 20 journals or magazles in different magazines in different languages aroud the world. I feel that I thus can do more good with less expenditure of precious time and effort.

If we remember the law of compensation — instead of whining about physical limitations, our mind can dwell cheerfully on the blessings that come with the years. After investing years in gaining knowledge and experience, we can begin to collect our dividends — in tranquility, and love.

If we can give sympathy and understanding to our fellow men, love in rich measure will come to us.

ABOUT THE AUTHOR—One of the world's most distinguished bridge engineers, David Barnard Steinman was a university professor of engineering at 24, and since the age of 30 has designed and constructed important bridges in the United States and on four other continents.

These include the Kingston Bridge and the Mackinac Bridge, the Interboro Bridge and many military bridges for the United States Government. Dr. Steinman belongs to numerous professional and scientific societies and associations and has written books on bridges and aerodynamics. He lives in New York City, where he was born June 11, 1886.

INSTITUTO TÉCNICO DE LA CONSTRUCCIÓN Y DEL CEMENTO

D. B. STEINMAN

estética y función en el puente

Artículo publicado en el n.º 82 de la
Revista Informes de la Construcción

Junio - Julio 1956

PATRONATO «JUAN DE LA CIERVA» DE INVESTIGACIÓN TÉCNICA DEL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

REPUBLICAN-NEWS

and ST. IGNACE ENTERPRISE

ST. IGNACE, MICHIGAN, THURSDAY, AUGUST 23, 1956

COULDN'T BE BUILT—TOLD BY STEINMAN

A "stubborn group of Doubting Thomases," whose skepticism delayed building of the Mackinac Bridge for years, and then prompted "extravagant strength" to be built into the structure just to satisfy the scoffers, has cost the people of Michigan unnecessary millions of dollars, Dr. D. B. Steinman, designer of the span, declared at Cedarville last night.

Introduced by Prentiss M. Brown, chairman of the Mackinac Bridge Authority, Dr. Steinman, internationally distinguished bridge engineer, was principal speaker before the 1956 annual banquet of Les Cheneaux Chamber of Commerce. Les Cheneaux, an upper peninsula resort area adjacent to the world-famed bridge, also played host to many other leading Mackinac Bridge officials. Toastmaster was Dr. Harold Sponberg, vice-president of Northern Michigan college, Marquette.

Significantly, the title of Dr. Steinman's address, "The Bridge That Couldn't Be Built", reflected the tenor of his message.

"Certain people," declared the speaker, "said the project was impossible; that the cost would be prohibitive; that it could not be financed; that the bridge could not be built; that the foundation difficulties were insurmountable; that the wide glacial gorge under deep water in the middle of the Strait could not be spanned; that the bridge, if built, would not stand up; that it would be destroyed by the elements; that no foundation piers could withstand the pressure of ice from the Great Lakes in winter; that no span could withstand the storms and wind forces at the site.

"But despite all obstacles and difficulties, both natural and man-made, the project has been successfully financed; all of the engineering problems have been successfully, economically, and safely solved; the difficult foundations have been successfully conquered; and the construction of the bridge, commenced July, 1954, is now over two-thirds completed and is well on the way to meet the scheduled opening date of November, 1957."

Dr. Steinman then described the bridge's massive dimensions, and compared it, statistically, with the two next biggest suspension bridges in the United States—the Golden Gate Bridge and the George Washington Bridge— and stated that the total cost of the Mackinac Bridge, "including bond-interest during construction, is $99,800,000. This cost figure," he declared, "establishes a new record for the magnitude and difficulty of a bridge project. It is greater than the combined cost of the George Washington Bridge and the Golden Gate Bridge, added together."

"Because scoffers said that no bridge could withstand the pressure of ice at the site," the speaker asserted, "the piers and anchorages were generously designed with a safety factor of twenty against the greatest conceivable ice press that can possibly occur.

"Because scoffers said no bridge could withstand the wind and storms at the site, the Mackinac Bridge was extravagantly designed with a high factor of safety against the highest wind pressure ever recorded in the locality."

The speaker told his audience the Mackinac Bridge's assured safety has caused one other record to be set— an insurance record. "For the first time on any large bridge project," he stated, "one hundred per cent of the insurance of the $25,000,000 insurance coverage on the completed piers has been taken by U. S. companies, instead of going abroad for the bulk of the insurance as originally anticipated."

Dr. Steinman, holder of numerous honors in bridge engineering circles of the world, illustrated his Les Cheneaux address with color-slide films. He closed his address by saying the story of the Mackinac Bridge can be summarized in these four lines:

"Generations dreamed the crossing,
Doubters shook their heads in scorn.
Brave men vowed that they would build it—
From their faith a bridge was born."

THE CITY COLLEGE
ALUMNUS

On The Campus

High-Ranking Engineers

The College's School of Technology ranks fourth in the nation in undergraduate enrollment, according to the United States Office of Education. The school is first in undergraduate enrollment in chemical and electrical engineering, second in civil engineering and third in mechanical engineering. Day session technology enrollment is 2,921. An additional 1,274 attend the evening session.

Debt of Honor

Last year, Nicholas Voulgaris '57, a young Greek exchange student, received a David B. Steinman Foundation award to enable him to continue his studies in engineering at the College. He sat down and drew up the following pledge: "I, Nicholas Voulgaris, in consideration of having received a David B. Steinman Award in the Amount of $300.00, which I consider to be an honor loan to help me complete my higher education in the United States, do declare myself as follows: In the event that I have not made substantial repayment before returning to my homeland, Greece, and that Greek monetary policy should make it impossible for me to repay this debt of honor from Greece, I shall by suitable arrangement undertake to contribute a like sum to a Greek University to be used to provide assistance to some worthy student as I have been assisted."

The Cooper Union for the Advancement of Science and Art

COOPER SQUARE, NEW YORK 3, N. Y. ALGONQUIN 4-6300

ART SCHOOL
SCHOOL OF ENGINEERING
EVENING FORUM SERIES
MUSEUM FOR THE ARTS OF DECORATION
THE LIBRARY

David Barnard Steinman

Civil Engineer, bridge-builder, scientist, inventor, man of letters, humanitarian -- the roster of your achievements is a witness to your amazing versatility. As a designer of almost four hundred bridges on five continents you are internationally acknowledged as a master in combining engineering skill with architectural beauty. You have disseminated your knowledge and experience as an authority on long-span bridges through numerous books and monographs. Your career has been an inspiration to thousands of young engineers and engineering students. Among your many services to society has been the founding of the David B. Steinman Foundation for grants to education, for research, and for student aid. Because you have been notable in carrying out the aspirations of Peter Cooper for the advancement of science and art, your Alma Mater chooses you for this citation.

The Cooper Union Alumni Gathering Banquet
Saturday, October 6, 1956

A D S P I C E

RESPICE

PROSPICE

Centennial Medal

DAVID B. STEINMAN '06

If the Brooklyn Bridge is your "first love," then the heap of solid rock where City College stands is your second! Your strength and your resources have been used for The City College since the days of your youth. Teacher and pioneer in the earliest days of the School of Technology, later employer of its graduates and generous benefactor through a system of graduate scholarships, your devotion has been constant. In the College's Centennial celebration, you were one of only seven of its sons to be honored with the degree of Doctor, honoris causa. Through your poetic vision and the glory of your professional career as a builder of great beautiful bridges, you have further enhanced the name of City College. A member of the Board of Directors of The Alumni Association for over a generation, you have served in many capacities, including that of First Vice President. Only the limitation of physical energies prevented your accepting the highest office within our power to bestow. As Honorary Director of The Association and as Trustee of The City College Fund, your work and your spirit are still intimately bound up with those of Alma Mater. Richly do you merit the appellation of alumnus extraordinarius.

Ingeniero Roberto Torretti P.

El puente en avanzada construcción sobre el estrecho de Mackinac entre los lagos Hurón y Michigan en EE. UU.

Proyecto del Ingeniero Consultor
Dr. David B. Steinman

Tomado de "Anales del Instituto de Ingenieros de Chile", Abril, Mayo y Junio de 1956

UNTERSUCHUNG DER AERODYNAMISCHEN STABILITÄT DER MACKINAC-BRÜCKE

VON

Dr. D. B. STEINMAN

Beratender Ingenieur
New York

Auszug aus Nr. 4 — April 1956
der
INTERNATIONALEN ZEITSCHRIFT FÜR STAHLVERWENDUNG
ACIER · STAHL · STEEL

Herausgegeben von der
BELGISCH-LUXEMBURGISCHEN BERATUNGSSTELLE FÜR STAHLVERWENDUNG
(Centre belgo-luxembourgeois d'Information de l'Acier)
47, rue Montoyer und 3, rue de la Science, Brüssel

unter Mitwirkung der
BERATUNGSSTELLE FÜR STAHLVERWENDUNG, DÜSSELDORF,
UND DES DEUTSCHEN STAHLBAUVERBANDS, KÖLN

Journal of the Royal Society of Arts

GIFT OF MEDAL TO THE SOCIETY

A bronze replica of the medal reproduced above has been presented to the Society by the Professional Engineers of France, at the request of Dr. D. B. Steinman, one of its Fellows, in whose honour the medal was struck and to whom it was initially awarded in gold; a bronze replica will be struck annually for award by the Professional Engineers of France. The medal is the work of Professor A. F. d'Andrea, also a Fellow of the Society and Head of the Art Department of the City College of New York.

The reverse of the medal bears Dr. Steinman's design for the proposed Messina Straits Bridge, a five thousand foot main span to connect Sicily to the mainland of Italy.

NO. 4982 20 JULY 1956 VOL. CIV

New York Bridgebuilder's Poems Become Popular Hymns in Australia

The Black Forest Methodist Sunday School in Glandore, South Australia has selected two of D. B. Steinman's widely publicized poems to be used as hymns in their Sunday School Hymnal. Dr. Steinman, famed as a New York bridge engineer, has had many of his poems published, including a volume of verse entitled "I Built a Bridge and Other Poems". Following are the poems, "As Partner With Thee" and "Christmas Symphony", and the music of Hymns No. 261 and 538, respectively, to which they are sung.

#60

In Oversize Box 30

Extrait du GÉNIE CIVIL du 1er juin 1956

LA STABILITÉ AÉRODYNAMIQUE DU PONT DE MACKINAC

(États-Unis)

Dans le *Génie Civil* du 15 juin 1955, nous avons donné une description générale du viaduc actuellement en construction sur le détroit de Mackinac, entre le lac Michigan et le lac Huron. Il nous semble intéressant de compléter cette étude en exposant les principes appliqués pour assurer la stabilité complète de l'ouvrage sous l'action des plus grands vents prévisibles et en donnant les résultats des essais effectués en soufflerie sur un modèle d'un tronçon de l'ouvrage ; ces essais ont confirmé les

— Le phénomène de l'instabilité aérodynamique peut être déterminé par une analyse scientifique.

— Il est plus scientifique (et plus économique) d'éliminer la cause de l'instabilité aérodynamique par un tracé scientifique, que de donner à la structure une section et un poids lui permettant de résister aux effets de l'instabilité aérodynamique.

— Toutes les sections transversales de ponts ne se comportent pas, aérodynamiquement, de la même façon. On peut les classer en sections stables ou instables, à divers degrés pour les trois genres d'oscillations (verticales, de torsion ou combinées)

PENINSULA POETS

Volume XI | Autumn 1956 | Number 4.

SING THEN I MUST, UNTIL MY SONG BE HEARD

(Motto of the Poetry Society of Michigan)

NEW YORK CITY:

We welcome Dr. David B. Steinman to the Poetry Society of Michigan. As consulting engineer on the Mackinac Straits bridge, Dr. Steinman has become a proud part of the Michigan scene. As a poet, Dr. Steinman has devoted many hours in recent years to constructing poems that appear regularly in many magazines, among them PARTNERS, NEW JERSEY CLUB WOMAN, THE SIGN and SCIMITAR & SONG. He is the author of "I Built A Bridge" from the Davidson Press, New York. He has recently been named a trustee of the Poetry Society of America. We in Michigan welcome you, Dr. Steinman!

AD ASTRA

Man reared a cathedral—
From vaulted depths the towers rise and soar
In pinnacles and spires that pierce the blue,
That men may glimpse, in Gothic tracery,
The lift of angel wings upraised in prayer,
A prayer ascending to the infinite—
—To reach the stars.

Man built a bridge—
From caissons deep below the swirling tides,
Majestic pylons interlaced with light
Rise proudly upward to the azure vault
To hold a harp outstretched against the sky,
A poet's dream against the sunset gold—
—To reach the stars.

Man made a song—
From deep within the hungry hearts of men
The song calls forth the longing and the dream
And swells the music of the star-filled skies
With raptured notes of Nature's symphony,
Hearts soar aloft on wings of melody—
—To reach the stars.

David B. Steinman

Y AND ITS VOCATIONAL SYMBOLS

D. B. STEINMAN

Steinman, bridge builder of international renown, it civil engineering after receiving a Ph.D. from mbia. Since 1920 he has devoted his energies to ing bridges on five continents and is currently at on the largest bridge in the world across the Straits lessina. Notable among the hundreds of bridges e he has left his mark are the Triborough and Henry son Bridges as well as the Brooklyn Bridge he d renovate to meet modern traffic needs.

IETHER "Beauty is in the eye or is a tangible and dimensional em in definitions. The natural inkind a variety of things of ers no greater reward than the es out of the resources or mate- he hey be a statue, a build- In wn life, the bridge with ind angles, as it fights gravity e sky, is the living symbol of for growth, for conquest, for

s a symbol out of his experience n concept of an ideal out of his xcavator sees a symbol of power ie snort of a bulldozer or the a clam-shell bucket. The archi- er has the same poetic glow of ndeur and splendor as the de- edral, and to hoth it can be etic triumph.

· huilder and I am primarily with vocational esthetics as a cultural rewards. I can admire of Roehling in the old Brooklyn ense of adventure in his mind across the tidal sweep of the isualized the web of steel that path for commerce between Brooklyn. I speak with feeling as my task in 1948 to help re- dge to meet the demands of ive commerce. Here was the ire the drag of gravity using

lantic liners of William Francis Gibhs. Man, imitative and curious, has found esthetic excite- ment in his conquest of the air from the first paper design of Leonardo da Vinci to reality of flight by the Wright brothers at Kitty Hawk.

Cultural enjoyment is always a mental exer- cise in which the mind finds its pleasure, even its fear, in symbols. The whole world mourned the sinking of the Andrea Doria, but none more than the sailor who beheld it as a masterpiece of ship designing, as pleasurable to the eye in motion as it was useful to its passengers seek- ing a means of transport over water. The loss is an art tragedy, of far greater significance than the money loss of an investment in a carrier of passengers and mails.

A beautiful building is a pleasurable experi- ence for the eye, not alone in the success of its lines, or the materials used, but often in its va- riety of scenic moods against the dawn, the sunset, the moonlight, or even the snow squall. Buildings, boats, and hridges take on person- alities, and even suggest individual tempera- ments. There was even talk of the demon-pos- sessed hridge that crossed the Tacoma Narrows and, mysterious warnings, whipped itself to destruction on Novemher 7, 1940. Actually, it was an evil wind whose force and fickleness were underestimated that set up the violent con- tortions of the steel span in a dance of death. The whims of nature have to be considered in an esthetic approach to the combined utility and heauty of a hridge, boat, or huilding.

Cities have personalities that conjure up es- cisco, blessed with a natural setting of beauty, unveils its Golden Gate Bridge almost daily from the fog that rolls in from the sea. Man- hattan comhines architectural grandeur and splendor with its spiked horizons and river rhythms of skyscrapers and bridges.

Occasionally, an esthetic-minded puhlic can change official decisions. In the design of the George Washington Bridge, the strong esthetic appeal is due largely to the natural grace and simplicity of the suspension type—expressed by two high and sturdy towers and the natural parabolic arcs of the great cahles from which the slender floor system is suspended. The striking beauty of the steel towers was not planned. They were designed merely as load-carrying skeletons to he subsequently encased in concrete and ma- sonry. The authorities gladly yielded to the public when it demanded that no false facing be added.

The late Arnold W. Brunner, architect and city planner, expressed a deep feeling when he said: "There is something about a great bridge which better unites the work of God and man than any other structure." A 16th Century bridge designer, Palladio, recorded a standard for future ages when he declared that bridges should be "convenient, heautiful, and durable." Every bridge should he designed with the guiding and impelling thought to achieve beauty. To huild their famous aqueducts, the ancient Romans used thousands of tons of masonry in massive piers and arches to carry a small conduit for water supply. To-day, graceful, airy spans of steel carry thousands of tons of useful load. Ponderous proportions are no longer the visual expression of power.

Beauty of Design

The primary essentials for making a structure of esthetic appeal are honesty and simplicity, plus elementary beauty of line, form, and pro- portion. In the words of Fra Filippo Lippi, "If you get simple beauty and naught else, you get about the best thing God invents." There are different conceptions of what constitutes beauty in bridges and, correspondingly, there are differ- ent methods of attaining it. Some of the concep- tions are characteristic of the country of origin.

ВІСТІ УКРАЇНСЬКИХ ІНЖЕНЕРІВ

UKRAINIAN ENGINEERING NEWS

2

БЕРЕЗЕНЬ — КВІТЕНЬ 1956
Ч. 2 (47), РІК VII. ■ VOLUME VII.

JOURNAL

Florida Engineering Society

THE MACKINAC BRIDGE
CONQUERING THE IMPOSSIBLE
By D. B. STEINMAN, Consulting Engineer

Introduction

Dr. D. B. Steinman

The thought of connecting the two sections of the State of Michigan by a physical link across the Straits of Mackinac has challenged the imagination of engineers and the public for the past three-quarters of a century. The difficulties, both physical and financial, appeared insurmountable. Various plans and designs were proposed from time to time during the past forty years. Some of the schemes would have been impossibly fantastic in cost, but the promoters did not know it. One official design for the proposed bridge would have collapsed before completion, but the officials did not know it.

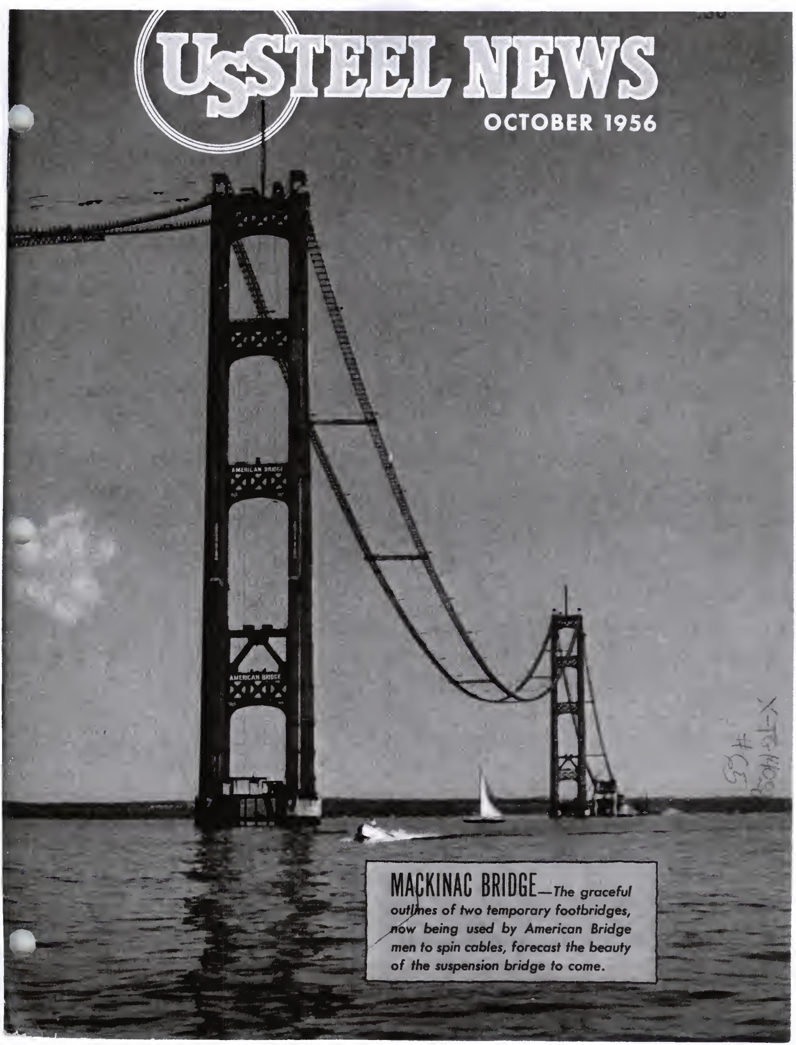
People (who were not engineers) said that the project was impossible; that the cost would be prohibitive; that it could not be financed; that the bridge could not be built; that the foundation problems could not be solved; that the wide *glacial gorge under deep water in the middle of the Strait* could not be spanned; that the bridge, if built, would not stand up; that it would be destroyed by the elements; that no foundation piers could withstand the pressure of ice from the Great Lakes in winter; that no span could withstand the storms and wind forces at the site.

Despite all obstacles and difficulties, both natural and man-made, the project has now been successfully financed; all of the engineering problems have been successfully, economically and safely solved; the difficult foundations have been successfully conquered; and the *construction* of the bridge, *commenced in July 1954,* is well under way to meet the *scheduled completion* date of *November 1957.*

The Mackinac Bridge is five miles

US STEEL NEWS

OCTOBER 1956



MACKINAC BRIDGE—*The graceful outlines of two temporary footbridges, now being used by American Bridge men to spin cables, forecast the beauty of the suspension bridge to come.*

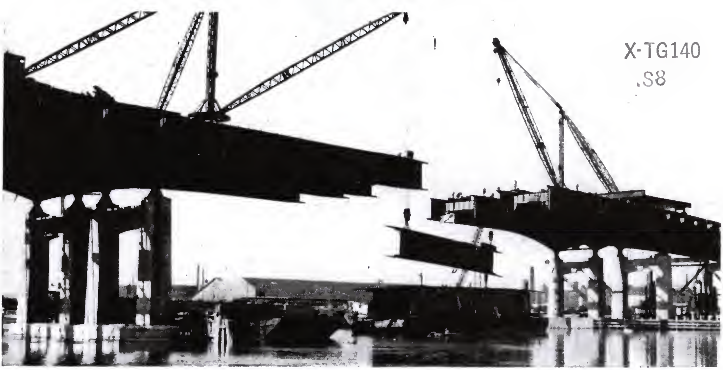
H. D. Ellis

The Bridge They Built for Fun

By W. R. MacKay and M. L. Andrea

So you're planning a vacation. Here's a place you may have missed before. Take the new Mackinac Bridge north . . .

#2C



Connecticut Turnpike span is closed and . . .

A New Plate Girder Record Is Set

Steelwork closure has been completed on the longest plate girder span—387 ft—in the Western Hemisphere. The structure crosses the Quinnipiac River at New Haven, to carry the six-lane Connecticut Turnpike over lowlands and the stream. The bridge also is the longest water crossing on the 192 mile highway.

Designed by D. B. Steinman, New York City consulting engineer, the 11,500 tons of steel in the superstructure were fabricated and erected by Bethlehem Steel Co., after substructure work had been completed by Moore & Lopier of New York City.

Built on an arc of almost 180 deg, curving to the north, the 3,769 ft structure stands on 21 piers, with the two center piers providing a clearance of 55 ft above mean high water.

The main girder—being closed with final steel in the photo at top—is flanked with two side spans, each 258 ft long. The final gap was closed with four girders, each about 108 ft long and weighing about 89 tons.

The 21.6 ft deep haunches for the main girder were split longitudinally for ease of handling and shipping, then riveted together in place.

Previous U.S. plate-girder record-holders were the New Jersey Turnpike bridges over the Hackensack and Passaic rivers. Both of these have 375 ft center spans.

TRAVELER places steel from east bank of river over piers and temporary supports.

LONG CURVE of structure, to gain required height over flat terrain, is evident in view looking westward toward New Haven.

TEMPORARY SUPPORT for main girder erection is supplied by spud pile assembly. Half of main-girder haunch rests on barge.

REPRINTED FROM ENGINEERING NEWS-RECORD, October 31, 1957

Photos by Ellis

Final touches are given to the world's longest suspension bridge as . . .

Michigan's Bridge Dream Comes True

For seven decades engineers have dreamed of bridging the Straits of Mackinac between St. Ignace and Mackinaw City. That dream becomes a reality tomorrow (Nov. 1) when toll traffic begins flowing across the four-lane $100 million bridge.

Its designers proudly acclaim it the world's longest suspension bridge—8,614 ft including anchorages. Its builders point with pride to completion of the five-mile project in four construction seasons. And its backers are pleasantly mindful of the fact that its cost will not exceed the original estimate. The contract cost is about $80 million.

The target completion date of Nov. 1, 1957 for opening the bridge to traffic was established to accommodate the annual influx of big game hunters. The hunters, however, together with other traffic during November will constitute only about 10% of the annual traffic over the bridge. The biggest revenue months should be July and August which average 26% and 32%, respectively, of the annual traffic.

Toll charges will compare favorably with those of the state-owned ferries which the new bridge replaces. One-way fares range from $3.25 for a passenger car to $14 for the largest trucks. Pedestrians will not be permitted on the bridge, but intracity bus service will be operated by the Michigan Toll Bridge Authority.

Mackinac Bridge is 17,913 ft long. It is made up of 8,614 ft of suspension spans including anchorages, 16 deck truss spans totaling 5,691 ft on the south side, and 12 deck truss spans totaling 3,608 ft on the north, or St. Ignace side. The bridge crosses Mackinac Straits on almost a direct north-south line.

The suspension portion of the bridge includes a 3,800 ft main span, two 1,800 ft side spans, two 472 ft backstay spans and two 135 ft long concrete anchorages.

The 3,800 ft main suspension span is second in length to the 4,200 ft Golden Gate Bridge span. But the use of five cable spans with remote anchorages located for economy at shallower rock locations makes the 8,614 ft link between anchorages the longest in the world. The stiffening trusses are 38 ft deep and 68 ft c-c.

• **Design factors**—The bridge is designed for H20-S16 truck and trailer loading, and for a wind pressure of 50 psf combined with dead load. The anchorages were designed for an ice pressure of 115,000 lb per lin ft and foundations were designed for an allowable pressure of 15 tons per sq ft.

The four-span continuous deck trusses in the approach spans contain floor members of carbon steel designed for 20,000 psi and silicon steel with a working stress of 27,000 psi. Field connections were made with high strength bolts.

The stiffening trusses were designed to be fastened to the 24½ in. dia suspension cables at the center line of the 3,800 ft main span by heavy plates pinned to a special cable band at that point. Thus the traction forces, longitudinal wind and torsional effects resulting from asymmetrical loading are transferred to the main cables.

• **Cable-spinning record**—New cable-spinning records were made last year when the two suspension cables were spun in 78 two-shift working days, between July 18 and Oct. 19 (ENR Mar. 28, 1957, p. 55). The 24½ in. dia cables stretching between anchorages located 8,344 ft apart required 11,100 tons or a total of 41,000 miles of $\frac{3}{16}$ in. dia wire.

The total cost of 55,000 tons of structural steel together with that of the cable items was nearly $45 million—the largest bridge contract ever written.

The main towers rise to a height of 525 ft above their supporting concrete piers. They contain a total of 13,000 tons of structural steel.

• **Foundation construction**—Constructing the foundations for the bridge was also a gigantic undertaking. It included the placing of nearly 500,000 cu yd of

REPRINTED FROM ENGINEERING NEWS-RECORD, October 31, 1957

FROM VISION TO ACHIEVEMENT

By David B. Steinman · *Consulting Engineer*

An Address Presented at the Golden Anniversary Convention of Triangle Fraternity, August 31, 1957, at Urbana, Illinois.

Abb. 1 Die Tabisoko-Brücke in Japan.

Dr. D. B. Steinman,
Beratender Ingenieur

Eine neue „Florianopolis"-Hängebrücke in Japan

Die Tabisoko-Brücke im Verwaltungsbezirk Offu in Japan ist eine Hängebrücke, deren Banart erstmalig in Florianopolis (Brasilien) zur Anwendung gekommen ist; allerdings wurden die verwendeten Ketten durch Drahtseile ersetzt. Die am 14. August 1954 fertiggestellte Brücke wurde unter Leitung der Bauabteilung des japanischen Ministeriums für Bauwesen errichtet.

Die Tragseile überspannen ein 114 m langes Mittelfeld bei einer Pfeilhöhe von 12 m. Über die beiden Pylone hinaus verlängern sich diese Tragelemente in Form von Anker- bezw. Spannseilen. Jedes dieser Seile setzt sich aus sieben 19drahtigen Litzen von je 45 mm Durchmesser zusammen.

Der Versteifungsträger (Fachwerkträger) ist in der Florianopolis-Bauweise ausgeführt; sein Obergurt wird im mittleren Teil des Trägers durch das Tragseil selbst gebildet. Auf diese Weise erhält man die größte Höhe des Trägers und das größte Trägheitsmoment an den Stellen, an denen bei einer Hängebrücke die größten Biegemomente auftreten. Der aus 32 je 3,50 m langen Feldern gebildete Träger hat eine Spannweite von 112 m.

Die von Längsträgern, die untereinander 1,35 m Abstand haben, getragene Fahrbahn ist 4,60 m breit und aus einer 18 cm dicken Stahlbetonplatte gebildet, auf der in 16 mm Dicke eine Zementbeton-Deckschicht aufgebracht ist. Das Gewicht des für den Überbau verwendeten Stahls beläuft sich auf 200 t, wobei noch das Gewicht des die Trag- und Hängeseile der Brücke bildenden 45 mm dicken Drahtmaterials mit einer Gesamtlänge von 8 000 m hinzuzuzählen ist.

Die erste in Brasilien nach der Florianopolis-Bauweise

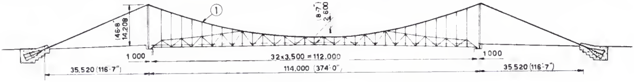


Abb. 2 Die Tabisoko-Brücke im Aufriß.
1. Tragseile aus sieben Litzen mit einem Durchmesser von je 45 mm.

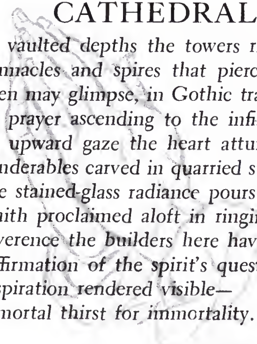
Auszug aus ACIER · STAHL · STEEL
47, rue Montoyer, Brüssel
Nr 1 - Januar 1957

BIG MACK, THE WORLD'S LONGEST SUSPENSION BRIDGE

Reprinted from
January 1957 Popular Mechanics

The SIGN
National Catholic Magazine

CATHEDRAL



From vaulted depths the towers rise and soar
In pinnacles and spires that pierce the blue,
So men may glimpse, in Gothic tracery,
Their prayer ascending to the infinite.
With upward gaze the heart attuned beholds
Imponderables carved in quarried stone,
While stained-glass radiance pours sacrament
On faith proclaimed aloft in ringing chimes.
In reverence the builders here have wrought
An affirmation of the spirit's quest;
An aspiration rendered visible—
The mortal thirst for immortality.

D. B. STEINMAN

November, 1957
Volume 37, Number 4

The American Bard

Vol. 13 April, May, June, 1957 No. 6

Wisconsin Poetry Magazine

Vol. 2 July-August 1957 No. 6

A VIRELAY OF SPRINGTIME

When love is young and hearts are gay
The thrush pours forth his virelay.

A bee counts not each honeyed tryst
While sipping nectar through the day;
For sweetness he can not resist,
He sips the blossoms' rich bouquet.
With many on his calling list,
His wings caress each flowering spray -
When love is young and hearts are gay.

Aloft a winged rhapsodist
Sings cheer and flings his heart away;
The gaily-feathered soloist
Proclaims his true love come to stay.
Beneath a sky of amethyst,
With nature in her bright array,
The thrush pours forth his virelay.

When springtime is the alchemist,
On flowered pathways lovers stray;
The young and carefree amorist
Will gather rosebuds in the May.
While swains find joy in maidens kissed,
The thrush pours forth his virelay -
When love is young and hearts are gay.

— *David B. Steinman*

Moral Armor for the Atomic Age

EXTENSION OF REMARKS
OF
HON. WILLIAM C. CRAMER
OF FLORIDA
IN THE HOUSE OF REPRESENTATIVES
Friday, July 12, 1957

Mr. CRAMER. Mr. Speaker, the graduates of the University of Tampa, Tampa, Fla., on June 6, 1956, were privileged to hear one of the most inspirational commencement addresses ever brought to my attention. It was made by a distinguished engineer and scientist, but the subject with which it dwelt was a stimulating and inspiring moment for those graduates presenting as it did the problem of the great faith we must have today—faith in ourselves and the religious tenets we, as people of free thought, have been taught throughout the years. There were many answers to the questions in the minds of these young people who face a world of great accomplishment and much bewilderment. I think that all Americans can gain inspiration and form a pattern for comfort and spiritual faith from this message. I am proud to ask inclusion in the RECORD of the commencement address delivered by David B. Steinman, internationally noted bridge engineer, scholar, scientist, and founder of the David B. Steinman Foundation for grants to education for research and student aid.

MORAL ARMOR FOR THE ATOMIC AGE

(Address by David B. Steinman)

On August 6, 1945, when the report of an atomic blast over Hiroshima was flashed around the globe, civilization was shaken to its utmost foundations. Individual reactions varied, from "I am scared to death," to "Father, forgive them for they know not what they do." On the whole, the impact was sobering. Men realized that, in one brief moment, the history of the world had been changed. For better or for worse, the story of mankind had entered a new and fateful chapter.

Mortal man stands frightened among the appalling forces he has summoned from the unknown. The dust stirred up by the atomic blast gets into his eyes and obscures his vision; and, in the blinding flash of the explosion, the inner light that should guide him is momentarily obscured. Beholding the nuclear conflagration, man feels himself a child playing with matches—and he grows afraid.

We are living on the edge of an abyss. Any rash act can precipitate our own destruction. Fear of such calamity underlies all our acts and thoughts today.

In the present world crisis, we can at least strive to avoid mad actions and pray to be delivired from blind accidents. Through enlightened public opinion we can prevent those who govern us from lapsing into carelessness. We can see to it that firebrands do not come into power. We need alert yet sober leaders who can and will think their way through the problems that confront us, real statesmen who can judge wisely and act decisively. We can have such leaders if we refuse to settle for less.

Civilized man is feeling the strain. There is a weary feeling of having almost reached the ultimate in the Faustian bargain of man's mastery over nature; and of having glimpsed in atomic power more of mastery—and of death—than man is ready to face.

Perhaps the fear and the soul searching it induces are hopeful signs. Many more people now sense the need of divine guidance, of a moral compass to steer by, if only because they realize that a single blundering act may prove fatal to our civilization, if not to the continuance of the race of man.

The realization grows upon us that the spiritual ideal has ceased to be a luxury and has become an absolute necessity. Today, in a literal sense never before so apparent, the moral law has become the law of survival.

To us, human life is sacred and inviolable. To the Communists, the individual is a cipher, to be exterminated at the will of a cold-blooded autocrat; people are so much brick and mortar for the construction of a soulless utopia. They demolish a human community with as little feeling as if it were an anthill.

In our struggle for the heart of man, we must renew the faith; gain again the flaming emotion of Pitt and Cromwell; of Washington, Lincoln, and the great founders of the Republic; of St. Paul and all the great Christian martyrs who died for their religious beliefs. We must fire political doctrine and spiritual ideals with ardent belief, with the magic of passion, for our own sake and for the decency of mankind.

Daily we pray, "Thy kingdom come." Without a belief in the ultimate good, all we have held sacred becomes meaningless. Without this ringing faith we are lost.

There is no old world to go back to; a new one must be made, and there are tigers in the way. We must breed and nurture a robust vigor to resist the vicious assertion that a state is an autocratic entity with supreme rights; that it need have no morals or obligations, and that its members are creatures to do its soulless bidding regardless of their own instincts of human dignity and of kindliness.

We must cling to honor, to moral courage, to humanitarian ideals—to all the sanctities of life—and defend them, for these are the things our godless adversary would destroy.

There is a tendency to think of all these things in far too small units of time. Many are in panic because we have not solved the problems of the atomic age in the brief span of 10 years. A lifetime is only a second of eternity. All historic time is only a moment in the eternal plan. Mankind is barely emerging from the nursery. He stands bright eyed with new knowledge of his past and, for the first time, with the power and will to mold his own future. We must educate our youth so that they will be strong to resist evil and to fight for the things that endure. With resolute faith and courage, guided by their power for reason, their power for virtue, and the power of spiritual truth, they will make a braver new world.

St. Thomas Aquinas once said that there are only three really important endeavors in life: To have faith in the right things, to hope for the right things, to love the right things in life.

Our faith, hope, and love for the good, the true, and the beautiful find their expression in science, religion, and art. These are the three main pillars of civilization. For man's highest fulfillment, we must revere all three.

Religion, art, and science, representing the everlasting search for the good, the true, the beautiful, constitute a trinity of human aspiration. All three are but different aspects of the same reality, of the same feeling for the sublime, rooted in the supreme mystery of being.

It has been pointed out that there is a common and unifying element—what we identify instinctively as the divine spark—in a Raphael Madonna, a Beethoven symphony, a discovery by Copernicus, Newton, or Einstein. In each instance, inspiration was drawn from some common reservoir of spiritual vitality. In each there were moments of flashing intuition that call to mind the Burning Bush that spoke unto Moses. The experience of sudden inner illumination beyond mere intelligence, the inner light known to mystics, martyrs, and poets, is not unknown to creative scientists and inventors.

Art and religion are related. They flow from the same fount of inspiration in the human soul. We need only to think of the Psalms and the Prophets, or supreme examples of religious music and painting, to see their intimate relationship. And foremost thinkers among scientists and theologians are coming to recognize that science and religion also are closely related. As the horizons of science advance, many of its great leaders become more humble, not less; more reverent, not less.

The more deeply we delve into the heart of nature, the more awestruck we stand in the face of ineluctable mysteries. As the frontiers of science advance, the scientist, the poet, and the religious man meet on common ground—the common ground of the ultimate, the infinite, the eternal.

The man who discovered that electricity and magnetism are related, Hans Christian Oersted, once said, "The Universe is a manifestation of an Infinite Reason and the laws of Nature are the thoughts of God."

PROFESSIONAL RECORD OF

D. B. STEINMAN

Bridge Engineer

REPRINTED FROM "WHO'S WHO IN THE EAST", Vol. 6, 1957

STEINMAN, David Barnard, bridge engr.; b. N.Y.C., June 11, 1886; s. Louis Kelvin and Eva (Scollard) S.; B.S. summa cum laude, Coll. City of N.Y., 1906, Sc.D., 1947; C.E., School of Mines (Columbia), 1909, A.M., Columbia, 1909, Ph.D., 1911, Sc.D., 1953; Sc.D., U. Ghent (Belgium), 1953, Minerva Univ., Italy, 1953, Haute Academie Latine Internationale, France, 1954, E.D. (hon.), Manhattan College, 1953; Reusselaer Poly. Inst., 1953, Ohio No. Univ., 1953, Mich. Coll. Mining and Tech., 1954; D.Sc. in Engring., Sequoia U., 1953; LL. D., Alfred U., 1953; Dr. C.E. (hon.), U. Bologna, 1954; m. Irene Hoffman, June 9, 1915; children—John Francis, Alberta, David. Engring. work until 1910; prof. civil engring. U. Ida., 1910-14, also cons. practice; spl. asst. to Gustav Lindenthal on design and constrn. Hell Gate Arch Bridge and other notable bridges, 1914-17; prof. in charge civil and mech. engring. Coll. City of N.Y., 1917-20; cons. practice, 1920—. Designing or cons. engr. many notable bridges, including: suspension bridge at Florianopolis, Brazil, 1922-26; Carquinez Strait Bridge, Cal., 1923-27; bridge at Grand Mere, Quebec, Can., 1928-29; St. John's Bridge, Portland. Ore., 1929-31; Mt. Hope (R.I.) Bridge, 1927-29; Waldo Hancock Bridge, Me., 1930-31; Tri-Borough Bridge, N.Y. City; Sky-Ride and Observation Towers (Century of Progress Expn., (Chgo.), 1933; Henry Hudson Bridge, N.Y.C., 1934-36, Thousand Islands internat. bridge, over St. Lawrence River, 1937-38; Lions Gate Bridge, Vancouver, B.C., Can., 1937-39; Charter Oak Bridge, Hartford, Conn., 1941-42; engaged in reconstrn. Brooklyn Bridge, 1948-52, Constitution Bridge, San Juan, P.R., 1952-54, Kingston Bridge over Hudson River. 1952-56. Raritan River (N.J.) Bridge, 1952-54, Greenwich-Killingly Expressway, Conn., 1954-55, Mackinac Strais Bridge, Mich., 1953-57; mem. senate Columbia U. Dept. Engring., also mem. council for Sch. Engring. pres. Am. Tunnei and Turnpike Assn., 1932-34; hon. v.p. and mem. adv. council, Laymen's Nat. Com. Inventor of new influence line methods and charts for design of ry. bridges; improvements in suspension bridge design; new system of design loading for railway bridges; simplified methods of analysis for bridge design; aerodynamic analysis of suspension bridges, methods for securing aerodynamic stability, improvements in stereophotography. Lectr. on bridge design 42 univs. and colls. Fellow Aerial League Am., A.A.A.S., (life) Royal Soc. Arts; life mem. Phi Beta Kappa Assos., Am. Soc. C.E. (chmn. structural div. 1931-33; v.p. Met. Sect. 1933-34, pres. 1946-47); mem. Colegio de Ingenieros de Puerto Rico, N.Y. Good Roads Assn., Cooper Union Alumni Assn., Internat. Assn. Bridge and Structural Engrs., Am. Assn. Engrs. (pres. 1925-26), Nat. Soc. Profl. Engrs. (founder, pres. 1934-36), N.Y. State Soc. Profl. Engrs. (pres. 1930-33, chmn. board 1933-43, 1948-49), N.Y. State Bd. Examiners for Profl. Engrs. and Land Surveyors (vice chmn. 1931-33, chmn. 1933-35, 1941-43, 1945-47), Nat. Council State Bds. Engring. Examiners (pres. 1931-32), Am. Engring. Council (com. on bridge legislation 1930-34, Bklyn. Engrs. Club (pres. 1931-33), Am. Ry Engring. Assn., Am. Soc. Testing Materials, Am. Concrete Inst., Am. Mil. Engrs., Soc. Engring. Edn., Assn. Alumnl Coll. City of N.Y. (v.p. 1930-31; dir. 1947-49), Engring. Inst. Can. Internat. Assn. Bridge and Structural Engrs., Municipal Engrs. of N.Y., Corp. of Profl. Engrs. of Quebec, Profl. Engrs. of Ore., Ida. Soc. Engrs., Am. Inst. of N.Y., Nat. Pub. Housing Conf., Adv. Council of City Charter Com. of N.Y., Am. Math. Soc., Acad. Polit. Sci., Met. Regional Com. Engrs. Employment and Salaries (chmn. 1933-34). Phi Beta Kappa (pres. N.Y. chpt. 1933-34), Sigma Xi, Sigma Alpha, Chi Epsilon, Tau Beta Pi. Registered profl. engr. 20 states, tys. and provinces. Major, Corps Engrs. N.Y. N.G. Awarded J. James R. Croes medal, 1919, Norman medal, 1923, Thomas Fitch Rowland prize, 1929—all by Am. Soc. C.E.; Eggleston medal Columbia, 1950, artistic bridge awards, Am. Inst. Steel Constrn., 1930, 32, 37, 38, 39, 42, 54, 55; prize, Am. Assn. Engrs., 1926, for "Vow of Service." Alfred T. White prize, Brooklyn Engrs. Club, 1934; Townsend Harris medal Associate Alumni of Coll. City of N.Y., 1934. Alumni service medal, 1936. Columbia Medal for Excellence, 1947, Egleston medal, 1950, Distinguished Service scroll Nat. Council State Bds. Engring. Examiners, 1949, medal for outstanding civic contbn. Greater N.Y. Civic Center Asso. and 55 civic, archtl. and sci. orgns., 1950, certificate of cooperation MSA, 1952-54, highest award Nat. Soc. Profl. Engrs., 1952, testimonial scroll N.Y. State Soc. Profl. Engrs., 1953, William Procter prize for sci. achievement, 1953, citation and award Ohio Soc. Profl. Engrs., 1954. Recipient fgn. honors: Chevalier Legion of Honor; Knight Comdr. with star Order of Gold Cross of Mil. Chpt. of Cyprus and Jerusalem (Rome); Grand Cordon del'Etoile du Bien et du Merite; Chevalier Ordre du Merite Scientifique (France); Grand Croix de l'Etoile du Bien et du Merite (Paris); Marechal Caetano de Faria medal (Brazil); Comdr. of Merit and Edn.; Comdr. Mil. Order of Golden Cross of Cyprus; Comdr. Artistic Edn. (France), Comdr. Artistic Merit (France); Grand Cross Greek Order of St. Dennis of Zante; Knight Ordre Chevaliers de la Croix de Lorraine (Paris); laureat Grand Prix Internat. de l'Invention (Paris); gold medal Reconnaissance des Ingenieure Professionels Francais (Paris); Grand Officer de l'Edn. Civique (Paris); gold medal Center de Liaison des Ingenieurs Professionnels et Inventeurs de France; Comdr. Grand Prix Humanitaire de Belgique (Belgium); diploma and gold medal Associazionne di Cultura Letteraria e Scientifica (Genova); medal and diploma of honor Soc. Nat. des Medailles Civils (Paris); gold medal and diploma of honor Renaissance Francaise (Paris); Grand Officier du Merite pour la Recherche et l'Invention (France); Grand Officer de l'Edu. Sociale (Paris); medal de la Reconnaissance Francaise (Paris); gold medal and diploma of honor Union Internationale des Ingenieurs Professionnels; diploma and medal of honor Vets. of Nat. Mil. Service of Mexico; Cross of High Officer of Order of Merit for Research and Invention; meml. cross of Greek-Am. Legion; Grand Officer de l'Encouragement Public (Paris); cross of honor Legion Franco-Belge (Paris); Chevalier Order of Iron Crown of Araucania (Chile); Cross of Fundacion Internacional Eloy Alfaro (Rep. Panama); medal of arts. scis., letters Soc. d'Edn. et Encouragement (Paris); diploma and gold medal Inst. for Preservation Archtl. Treasures of Greece (Athens); gold medal and diploma of honor (as pres. N.Y. Acad. Scis., and pres. gen. Union Internationale des Ingenieurs Professionnels), City of Paris; gold medal and diploma of honor (Internat. Univ. Pro Deo (Rome). Clubs: Columbia University Engineers of N.Y.; City Coll.; Brooklyn Engineers; Ends of the Earth; Millions of Sydney, Australia (hon.). Author: Suspension Bridges, Their Design, Construction and Erection, 1923 and 1929; Suspension Bridges and Cantilevers, Their Economic Proportions and Limiting Spans, 1911, 1912; Theory of Arches and Suspension Bridges, from Melan, 1913; Concrete Arches, Plain and Reinforced, from Melan, 1917; Continuous Bridges, in Movable and Long-Span Steel Bridges, 1923; Suspension Bridges, in Movable and Long-Span Steel Bridges, 1923; The Wichert Truss, 1932; Stress Measurements on the Hell Gate Arch Bridge, with Appendix on Secondary Stresses in Hell Gate Arch, 1918; Locomotive Loadings for Railway Bridges, 1922; Moments in Restrained and Continuous Beams by the Method of Conjugate Points, 1926; The Eye-Bar Cable Suspension Bridge at Florianopolis, Brazil, 1927; A Generalized Deflection Theory for Suspension Bridges, 1934; Bridges and Their Builders, 1941; Rigidity and Aerodynamic Stability of Suspension Bridges, 1943. The Builders of the Bridge, 1945; Aerodynamic Theory of Bridge Oscillations, 1949. Associate editor Engineers Handbook Library, 1921-23,; Famous Bridges of the World, 1953; Mackinac Straits Bridge, 1954; Suspension Bridges: The Aerodynamic Problem and Its Solution, 1954; I Built a Bridge and Other Poems, 1955. Contbr. Ency. Britannica, Ency. Americana, Collier's Ency., Am. Soc. C.E. Trans. Presented with silver scroll, for contributions to advancement of engring., by 11 engring. socs., 1932. Inventor, improvements in stereophotography. Home: 305 Riverside Dr. Office: 117 Liberty St., N.Y.C.◎

DET BESTE
fra ledende tidsskrifter og aktuelle bøker utvalgt av
ÅRG. 11. NR. 1 Reader's Digest JANUAR 1957

Verdens fremste brobygger

Som liten gutt ble David Steinman betatt av Brooklynbroens mektige spenn, og i dag er han verdens fremste ekspert på brobyggingens område

Sammendrag fra Popular Science Monthly

Ira Wolfert

NÅR DIKTERE besynger våre dagers imponerende broer av stål og betong som vakre og storslagne nye skapninger unnfanget av mennesker, synes jeg det er helt naturlig at de bruker et slikt bilde. For en bro er til sine tider nesten som et levende vesen. Det forstår man best hvis man kikker over skulderen til brobyggeren David Steinman mens han arbeider.

Dr. Steinman har bygd broer på fem kontinenter, og under dette arbeidet har han oppdaget mange nye og viktige ting om dem. Men han sammenfatter alt sammen i en eneste setning. «En bro,» sier han, «er matematikk som det er blåst liv i.»

Når en ingeniør ser på en stor bro, ser han for seg et mektig drama. Han ser hvordan de forskjellige brodelene hjelper hverandre med å bære alle belastninger, de balanserer dem trygt og sikkert, spenner, tøyer og bøyer sine molekylmuskler, puster og peser under påkjenningen. Og når vinden tar i som verst, synger kablene som i tross sin monotone melodi.

«Harmoni med omgivelsene, og indre harmoni, rene linjer, riktige proporsjoner, symmetri, eleganse, rytme» — dette er noen få av alle de momenter som dr. Steinman tar i betraktning når han bygger en bro. Men først har han forsikret seg om at broen kan klare den oppgaven som

The Sign®

NATIONAL CATHOLIC MAGAZINE

NOT LIKE LUCIFER

O men of science who, with single aim,
Explore the elemental mysteries—
The pulse of light, the atom's secret core,
The swing and orbit of the cycling stars:
What of the things beyond your utmost lore
That neither graph nor scale nor rod can gauge,
Nor lens of telescope detect or span?
Whence burns your flame of selfless enterprise,
Your ceaseless quest to fathom the unknown?
What inner spark illuminates your mind
And spurs your search for truth exalting man?

High priests and acolytes of nature's laws:
Be not like Lucifer in pride of power,
Rather more humble grow, more reverent.
Your miracles but glorify the Source,
The Logos, perfect Word, that preconceived
The vast sublimities you now unveil.
With eons visioned in the primal plan,
The laws of nature are the thoughts of God.

D. B. STEINMAN

SEPTEMBER 1957

VOL. 37 No. 2

Reprinted from
THE BENT OF TAU BETA PI, *July 1957*

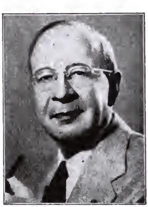
HORIZONS IN ENGINEERING

By D. B. STEINMAN, *New York Alpha* '06

HORIZONS are not boundaries. The future of engineering is unbounded. There is no limit to future progress and achievement.

The horizon is merely the line of tangency circumscribing that which is immediately visible. There are always much vaster areas beyond the horizon. The opportunities for future discoveries and inventions are unlimited.

The one assured fact is that horizons are ever expanding. As we scale new heights, new and greater horizons come into view.



DR. D. B. STEINMAN

When we stand on the seashore, our horizon is a circle of three miles radius. When we ascend to the top of the Empire State Building, our horizon is enlarged to a radius of forty-one miles. The area of our field of view is increased two-hundred-fold.

Our one lesson from past experience is never to underestimate the future of engineering progress. Each new discovery opens tremendous vistas of further invention and application. The quickening tempo is logarithmic. Each new generation, building on the past, sees more progress in science and engineering than was recorded in all the preceding centuries.

Before the dawn of history, the greatest engineering achievement was the invention and application of the wheel. This was man's first great improvement upon nature. The prehistoric genius who hit upon this apparently simple invention could not have visualized the vast future significance, the amazing vistas of mechanical progress thereby made possible. Hardly any subsequent engineering advance would have been possible without the wheel in its manifold developments, symbolized by all the indispensable wheels of industry, transportation, and power. One invention led to millions of others. If all the wheels used, consciously or unconsciously, in our daily lives were suddenly annihilated, our civilization would collapse.

Despite occasional myopic prophets who discounted further progress, engineering achievement has advanced at an ever accelerating tempo.

In 1837, a distinguished British scientist, with the odd name of Dionysius Lardner, published a scientific paper in which he proved, with irrefutable mathematical equations nobody could question, that it was impossible to build a steamship capable of a non-stop voyage from England to America. A few months later, on April 24, 1838, the steamer *Sirius* arrived in New York, the first to cross the Atlantic entirely under steam. The ship brought to America copies of Lardner's paper "proving" that such a voyage was impossible!

In 1843, Henry L. Ellsworth, U. S. Commissioner of Patents, wrote in his annual report to Congress:

> **"The advancement of the arts, from year to year, taxes our credulity and seems to presage the arrival of that period when human improvement must end."**

If the Commissioner had been a mathematician, he would have known the elementary fact that an expanding series can never be convergent; it can never approach a limit, but must continue to expand to infinity.

In 1902, Simon Newcomb, the distinguished American mathematician, published a paper in which he proved mathematically that mechanical flight, of a machine heavier than air and capable of carrying a man, was physically impossible. The following year, on December 17, 1903, two bicycle mechanics, the Wright brothers, made their epoch-making flight at Kitty Hawk in North Carolina—the first flight by man in a machine heavier than air. That is the way progress is made—by defying the impossible!

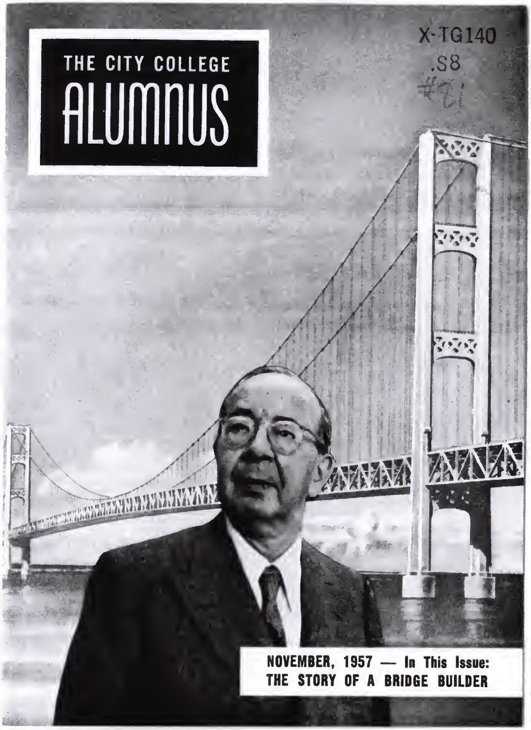
With their crude box-kite, made of wire, wood and fabric, and propeller-driven by a small motorcycle engine, Orville and Wilbur Wright ushered in the age of flight, leading to the present gigantic and powerful multi-engined planes and ultrasonic jet planes, and an unlimited future of rockets, artificial satellites, and space-travel.

THIS picture of human progress is sketched in some lines I have written, under the caption *Ad Astra.*

> **When man first flung a log astride a stream,**
> **He leapt millenniums beyond his birth;**
> **Now strands of steel translate his lofty dream**
> **To link the farthest corners of the earth;**
> **He tames the sea, and ventures forth to sail**

Dr. Steinman is a distinguished bridge engineer who has been honored by many governments and many universities. He is also a noted poet. He delivered this address at the University of Florida on March 11, 1957, following the dedication of the David B. Steinman faculty lounge there.

THE CITY COLLEGE ALUMNUS



NOVEMBER, 1957 — In This Issue:
THE STORY OF A BRIDGE BUILDER

Bridges of Love

The Kappa Phi Club

PROGRAM *and* DEVOTIONAL BOOK

1957-1958

Detroit Engineer

PUBLICATION OF THE ENGINEERING SOCIETY OF DETROIT
Formerly THE FOUNDATION

The Mackinac Bridge

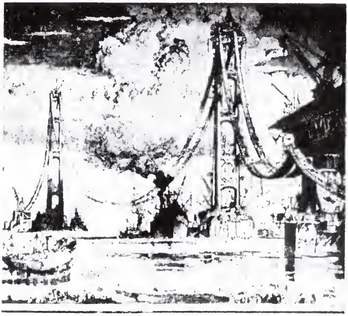
VOL. XXII OCTOBER 1957 No. 2

The Evening News

Mackinac Bridge Edition

SAULT STE. MARIE, MICHIGAN FRIDAY, NOVEMBER 1, 1957

Miracle Bridge At Mackinac, Book by Nevill and Steinman, Tells Story Behind the Story



Jacket design for Miracle Bridge at Mackinac (above) is an etching by Reynold J. Weidenaar. The book, published one week ago, was greeted with such an unexpectedly large advance sale that plans for a second printing now are being made.

The time was Jan. 14, 1955. The place was the Straits of Mackinac. An engineer sat in a rough office and checked hourly weather reports. Outside the office, men were working day and night with several million dollars' worth of floating equipment. All Great Lakes freighters had tied up for the winter a full month before.

The engineer worried. How long could he let his men work in the frozen Straits and still save the equipment from some sudden savage onslaught of weather? On the afternoon of Jan. 14 those minutes of grace ticked off with monotonous speed toward disaster. At last the final moment came. The engineer flashed the word to his boats. Head for cover now!

All the floating equipment—the tugs, the derricks, the barges—rushed for the shelter of Moran Bay in St. Ignace. As night closed down, the entrance to the bay was closed with a purposely sunken ship. At dawn the next day the worst blizzard of the year howled down out of the northwest.

Most people thought it was very lucky that the ships were ordered to shelter before the blizzard struck.

Others also might think it is lucky that the bridge now spanning the Straits of Mackinac holds firm against wind and storm and ice.

It isn't luck. It was planned that way. And to learn just how carefully it was planned you will have to read the book that tells you the story behind the story, "Miracle Bridge at Mackinac."

The story of the engineer's waiting game with the weather comes from Chapter Eight, which deals with what the authors call "Mackinac's Troublesome Twins." The Twins are the foundations for the two massive 47-story cable towers that hang in the Straits on a misty day like fairy battlements from some ancient time.

Miracle Bridge at Mackinac was written by the late John T. Nevill, Evening News columnist, and Dr. David B. Steinman, designer of the bridge. The happy collaboration of these two fine writers has produced a sensitive and understanding volume that is required reading for those who would know the full story of the Mackinac Bridge.

This is a large and handsome volume that came off the presses just one week ago, Oct. 25, published by the Wm. B. Eerdmans Publishing Co. of 255 Jefferson Ave. SE, Grand Rapids, Mich. It tells the story of the Mackinac Bridge in 19 chapters, with 16 pages of photographs, four pages of sketches by Reynold Weidenaar, and 17 engineers' drawings by the D. B. Steinman organization.

The book sells for $4.50. A first run of 5,000 copies was greeted with such an unexpected advance sale that immediately available copies in the publisher's hands were exhausted within three days. Plans for an additional press run of another 5,000 copies, and perhaps more, now are in the making.

The Mackinac Bridge book is the second volumn by Nevill, whose career as an author was cut short last summer by a tragic fire that claimed his life and destroyed his home at Spring Bay, on the lower St. Mary's River near DeTour. The fire came just as Nevill had completed the final chapter of his work.

Nevill's first book, Wanderings a collection of sketches of the north country which had appeared as columns in The Evening News, had sold out two editions at the time of his death.

For Dr. Steinman, the Mackinac Bridge book is one of a long list of publications dealing with his life's work of finding beauty in the design and construction of bridges. Dr. Steinman also has received 30 prizes for poetry within the last few years.

Professional Engineer

October 31, 1957

CHRISTMAS MAGIC

by D. B. Steinman

The star-shaped snowflakes softly fall
To deck each bough with sparkling white.
With magic wand the stars are hung
Like jewels of celestial light.
The treetop holds, as crowning gem,
The glowing Star of Bethlehem!

Once shepherds saw the wondrous Light;
Beside a crib they knelt in prayer.
The humblest hearth now glows with Love
Because His gift — a child — is there!
The angel voices sing again:
Peace on Earth, Good Will to Men!

D. B. STEINMAN

MORAL ARMOR for the ATOMIC AGE

of the strange and terrifying happenings by which he found himself surrounded. But now the dangers that confront us are born of man himself. As man first made Religion a shield against his ignorance, he now needs, more than ever, Religion as a shield against misuse of his rapidly-accumulating knowledge.

Our obligation, even in selfish terms of survival, is not to find a coexistence with evil but resolutely to oppose it and in the end to overcome it.

We have witnessed the Steam Age, the Atomic Age, the Electronic Age. But the basic moral values are ageless. They are the values distilled from man's total experience.

Precisely because we now have in our hands such immense natural forces capable of uprooting us, we need a sure anchorage in the soul. We need a renewed and revitalized emphasis on the enduring basic elements, such as truth and justice, loyalty and love.

Man must be awakened to the fact that, as never before, he is his brother's keeper. The human race must be made aware that reckless or unscrupulous conduct now amounts to race suicide—that man's true progress and security are to be found in the principles of universal kindness and universal good will.

Science is coming close to providing a world-wide storehouse of plenty; but that will avail us nothing if the spirit is left starved and our moral armor is neglected.

The one outstanding lesson of the present crisis of the human race is that man must relearn humility, reverence and spiritual faith. Today, Religion and Science both have vital roles to play. They must play them together in a concerted effort.

The final test of Science is not whether its accomplishments add to our comfort, knowledge and power, but whether it adds to our dignity as men, our perception and reverence for truth and beauty, our faith in the ultimate good. This is a test Science cannot pass alone and unaided. The major burden rests on Religion—to show to all men the way to a richer, fuller spiritual life, —a life keyed to eternal moral values.

The foregoing is the text of the Commencement Address Dr. Steinman delivered June 6, 1957, at Florida's University of Tampa.

Contractors and Engineers

JANUARY 1957

magazine of modern construction

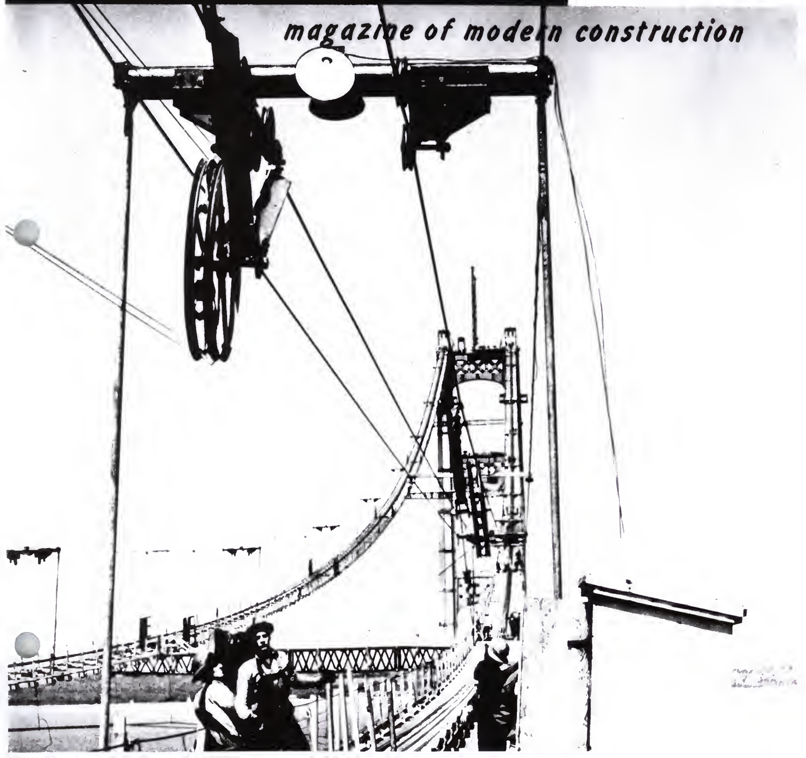


Fig. 1. General view of the Tabisoko Bridge (Japan).

Dr. D. B. Steinman,
Consulting Engineer,
New York

Japanese Suspension Bridge of Florianopolis Type

The Tabisoko Bridge in the Gifu Prefecture in Japan is a suspension bridge of the Florianopolis type *with wire cables*. It was built by the Road Bureau of the Japanese Ministry of Construction, and was completed August 14, 1954.

The cable span is 374 ft (114 m), with straight backstays. The cable sag is 36.8 ft (12 m). Each cable is made up of 19 wire ropes (7 × 19 wires), each strand 1 3/4-in (45 mm) diameter.

The stiffening truss is of the Florianopolis type.

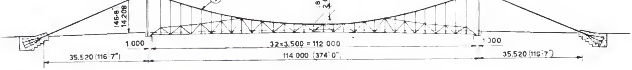


Fig. 2. Tabisoko Bridge. Elevation.
1. Cables made up of 19 wire ropes.

Reprint from **ACIER · STAHL · STEEL**
47, rue Montoyer, Brussels
No. 1 - January 1957

BITTERSWEET

By D. B. STEINMAN

Confined within a city tenement,
I dwell in semi-darkness like the blind,
Save for such little things as bring to mind
The brighter scenes in which my youth was spent.

The tinkling splash of water in the bath,
From leaking tap, is music to my ears,
Reviving memories of barefoot years,
A brook that skipped beside my boyhood path.

A pigeon cooing on my window sill,
Five stories high above the crowded street,
Recalls the joy of birdsong, bittersweet,
Of thrush and robin on a pine-clad hill.

Far from the open field, the fragrant bough,
Small crumbs of happiness are treasured now.

Reprinted from the March 1957 issue of
P A R T N E R S
The Magazine of Labor and Management

The Minaret

UNIVERSITY OF TAMPA, THURSDAY, MAY 23, 1957

COMMENCEMENT SPEAKER

DAVID B. STEINMAN

STEINMAN TO GIVE FORTIETH COMMENCEMENT ADDRESS

The noted New York bridge engineer, probably the foremost bridge engineer in the word, will deliver the commencement address to the graduates of the University of Tampa on Thursday evening, June 6th in the Municipal Auditorium. He is David B. Steinman of New York, whose most recent professional chose was the designing of the gigantic suspension bridge being completed across the Strait of Machinac. Steinman is head of a large New York firm of engineering consultants.

At the age of seven, Steinman was selling newspapers under the Brooklyn bridge Now he has his name on bronze tablets on that bridge for his work in reconstructing and modernizing that famous old structure, doubling its capacity for modern traffic. In addition, Dr. Steinman has been the designing or consulting engineer for the construction of 400 bridges on 5 continents. Eight of his bridges have been honored in annual awards for "The Most Beautiful Bridges In America"

Dr. Steinman received his BS degree (summa cum laude) at the City College of New York and his CE, AM and Ph. D. degrees at Columbia University. He taught for 6 years at the University of Idaho and City College in New York. Since 1920 he has been in private practice and has received numerous honors, national and international, for his distinguished achievements. He has twice received the Norman Medal, the highest award of the American Society of Civil Engineers, in addition to two other awards.

In all. he has received 19 academic degrees, including 4 earned and 15 honorary.

He is the founder and president of the David B. Steinman Foundation for grants to education research and for student aid. Dr. Steinman has achieved recognition as an engineer, scientist, mathematician, inventor, bridge builder, educato, lecturer, author, poet, and humanitarian. His life and his work have been an inspiration to thousands of young enginеerss and engineering students not only in America but throughout the world. Dr. Steinman's motto has been "Always to place service before profit." The title of his commencement address is "Moral Armor For the Atomic Age."

The Evening News

SAULT STE. MARIE, MICHIGAN TUESDAY, APRIL 9, 1957

Straits Span Described in Nevill Story

Why the Mackinac Straits Bridge will be recognized by bridge engineers as the safest large suspension bridge ever built is explained in the April issue of the magazine, Inside Michigan, in an article titled "Mackinac Bridge—The World's Safest."

Based upon information furnished by Dr. D. B. Steinman, designer of the $100,000,000 span and chief engineering consultant in its construction, the article is written by John T. Nevill, DeTour, feature writer and author, who also is co-authoring with Dr. Steinman a "popular-type" book on the Mackinac Bridge scheduled for publication this fall by Eerdmans Publishing Co., Grand Rapids.

The Inside Michigan article, somewhat technical in nature, attributes the Mackinac Bridge's amazing degree of safety to its hitherto unapproached degree of aerodynamic stability, a condition which Dr. Steinman says will make impossible the "compounded vibrations" which attacked and completely destroyed the Tacoma Narrows Bridge in 1940.

Michigan's Mackinac Bridge, writes Nevill in the article, has been made absolutely safe through the application of "bridge aerodynamics," a new engineering science which Dr. Steinman has pioneered during the past 20 years. "Suspension bridge aerodynamics," the article states, "has shown the way to avoid accidents similar to the collapse of the Tacoma Narrows Bridge. All of the conclusions reached during nearly 20 years of research, after numberless tests and experiments, and in the light of his (Dr. Steinman's) vast experience and reputation in bridge building, have been applied to the design of Michigan's Bridge to Holidayland. And, as Dr. Steinman put it, 'The Mackinac Bridge is one hundred per cent safe, aerodynamically, even under the most adverse conditions that may be expected to occur. The Mackinac Bridge represents the achievement of a new goal of perfect aerodynamic stability never before attained or approximated in any suspension bridge design."

* * *

"These," adds Author Nevill, "are reassuring words. Moreover, they are backed by other highly respected bridge engineers. Their accuracy can be and has been proved by scientific tests, the findings of which are expressed mathematically in charts, graphs and tables."

Nevill's article explains in detail precisely HOW Dr. Steinman achieved his goal of "perfect aerodynamic stability" in the mammonth span to be opened to the public next November.

* * *

Invited by William Eerdmans Jr., of Eerdmans Publishing Co., Grand Rapids, to do a full-length book for lay readers on how the Mackinac Bridge was constructed, Dr. Steinman agreed provided he could have a co-author. When the publishers agreed to this, Steinman promptly selected Nevill as his co-author. The two are now collaborating on the book, which is expected to be ready before the bridge is opened.

OCT 30

MIAMI DAILY NEWS

SATURDAY EVENING, APRIL 6, 1957

MUSICIANS CLUB OF AMERICA *presents "Distinguished American" award to Dr. David B. Steinman, eminent bridge designer, for his contributions to music, science, and art. Dr. Bertha Foster, pictured with him, is founder-president of the world's only club for retired musicians, singers and composers, in Coral Gables.*

American Engineer

JUNE

1957

Dr. D. B. Steinman Slated To Receive Gzowski Medal

Dr. D. B. Steinman, prominent NSPE member, is among the persons to receive an award at the annual meeting of The Engineering Institute of Canada on June 14 at the Banff Springs Hotel, Alberta. The presentation will be the last function of the 71st general and professional meeting of the Institute.

Dr. Steinman will receive the Gzowksi Medal, named after one of Canada's greatest engineers of the last century, for a technical paper entitled "The Design of the Mackinac Bridge."

The Society of American Military Engineers presented Dr. Steinman with the George W. Goethals Medal in May at its annual meeting in Washington, D. C. Dr. Steinman was the first recipient of the award in recognition of his eminent and notable contributions and improvements in bridge engineering design and construction.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

THE TAMPA DAILY TIMES

TAMPA, FLORIDA, MONDAY, MARCH 11, 1957

ENGINEER SAYS 'IT SEEMS A CRIME'

Expert Criticizes Existing, Planned Bridges Over Hillsborough River

One of the greatest bridge builders in the world took a look at the low level spans over Hillsborough River in Tampa during the weekend and observed: "It seems a crime they should ever build a bridge like this."

His words were timely since Tampa is in the midst of planning the construction of at least two more bridges to span the river, and perhaps a total of four.

The Lee-Krause bridge is planned as a low-level structure. The North Boulevard span is to be a medium high level type, while a viaduct type bridge is being talked for Davis Islands to connect with Bayshore Boulevard.

A fourth structure in the talking stage is one at Buffalo Avenue and most likely it would be a medium high level bridge.

The bridge expert who voiced his objections to low level spans was Dr. D. B. Steinman of New York City, who has spent his adult lifetime building and engineering some of the outstanding bridges of the world.

He stopped in Tampa enroute to Gainesville where today he was to be the principal speaker at the dedication of the David B. Steinman Faculty Lounge at University of Florida—an addition honoring his name. His subject was to be "Horizons in Engineering."

Last Friday, he received an L. H. D. Degree at Florida Southern College in Lakeland—just one of many such honors heaped upon him in the last several years at home and abroad.

Any bridge serving as a link in a modern thoroughfare should be a high level bridge, Dr. Steinman contends. Bridges like those in Tampa not only hold up traffic, but also shipping, he said. This is proved not only in Tampa, but also in Miami, he said, which is also suffering from bottled-up traffic because of the numerous low-level draw bridges.

"The high level bridge costs more money," Dr. Steinman said, "but in the long run they save money as well as do away with the draws."

Bridges should have generous approaches, he contended, even though it costs almost as much for approaches as it does the

DR. D. B. STEINMAN

bridges themselves. Without proper approaches, you create blight areas and slums along with traffic congestion, he explained.

"It's just good economics to plan bridges with ample approaches," he said.

Hits Eyesores

"And above all," Dr. Steinman said, "don't build bridges that are eyesores. People have to live with the bridges we build. We insist on beauty in our homes, schools and public buildings, we should equally do so in our bridges. As a rule it costs no more, but it does require a little more concentration and consecration of effort on the part of the engineer."

Dr. Steinman has dedicated his life to giving the world more beautiful, longer lasting and more practical bridges.

As a boy, he sold newspapers on the streets of New York. He used to look up at the Brooklyn Bridge and tell his fellow newsboys "some day I'm going to build a bridge as big as that one." They laughed. But he had the last laugh. In later years he landed the job of remodeling and improving that same Brooklyn Bridge.

Today, at 70, Dr. Steinman is still active, building bridges throughout the world.

A total of 43 bridges are being erected under his watchful eye, from Baghdad to Iraq, and from South America to the Great Lakes.

His new $100,000,000 Mackinac Bridge, connecting the upper and lower Michigan peninsulas, will be opened next November. It will be the largest suspension bridge in the world.

Dr. Steinman designed it and was its chief engineer.

Eight of Dr. Steinman's bridges have received awards as "the most beautiful in America." He specializes in long span bridges, especially the suspension type, and was consulting engineer on New York's famed George Washington Bridge over the Hudson River.

Pride and Joy

His pride and joy is the Mackinac Bridge which is costing more than the George Washington and the Golden Gate Bridges combined. It requires a million tons of steel and concrete.

Dr. Steinman built bridge models as a youth, and at age 13 took a course in elementary engineering in a night school. Since then he became one of the world's outstanding authorities on bridge building, as well as a noted author of popular books. He is an inventor and has received top scientific and professional honors.

Dr. Steinman holds degrees in science, engineering, philosophy, letters, humanities, laws—a total of 20, including those from a foreign university, an honorary degree from University of Bologna (Italy) and Ghent in Belgium. He holds some 300 international citations.

Procter Prize

For his work in prevention of damage to bridges from wind oscillation, he received the coveted "Procter Prize" of $1000 from the Scientific Research Society of America, and from the American Society of Civil Engineers he got their highest honors, called the Norman (gold) Medal.

Also the top prize of the International Society of Inventors, and was made president of the New York Academy of Sciences, of which he was made a fellow and life member. He has published a number of books and more than 500 professional papers.

In all he has built or worked on the engineering on 400 bridges on five continents, one in Brazil being the largest in South America.

On June 2, Dr. Steinman will receive an LL.D conferred by University of Tampa, where he will make an address. And on June 12, another degree, Litt D., from Loyola University at Chicago. He makes his Winter home at Miami.

X-1

DAVID BARNARD STEINMAN

Very Reverend President: It is my singular privilege to present a person who has won recognition as engineer, scientist, artist, inventor, bridgebuilder, educator, author, poet and humanitarian. Graduating summa cum laude from City College of New York, he earned three more academic degrees. For his achievements he has received eighteen more honoris causa from universities including Ghent, Bologna and Columbia. Author of some 750 publications, including fifteen books, 600 technical papers and some 150 published poems, he has received numberless awards and prizes. An internationally eminent bridge designer, he has spanned space with some 400 bridges on five continents, in Brazil, Australia, Baghdad, New York, California and now in the Straits of Mackinac. He has lectured on bridge design in forty-two leading universities.

To the architect is to be added the artist. His volumes of poetry have won many prizes. "Our lives are spans. With spark divine / We carry forward God's design." He is a life member and trustee of the Poetry Society of America. Only last month the Musicians Club of America presented to him its Distinguished American Award. Only this year the most successful Poetry Series offered by our University was sponsored by him. A deep humanitarian he is Founder and President of the David B. Steinman Foundation for grants to education, for research and for student aid. His benefactions are known to the recipients; but their true value and lasting importance perhaps only to God.

Reverend President: for his genius in the field of bridge design and for his scientific contribution, for his contributions to the fine arts and his love of beauty, for his eminent services as teacher and educator and for his generous benefactions to worthy causes and to deserving ones in need, I ask that on the roll of those whom Loyola University honors with the degree of Doctor of Letters, there be inscribed the name of DAVID BARNARD STEINMAN.

June 12, 1957

The Surveyor

Sixty-Sixth Year of Publication
Registered at the General Post Office

& MUNICIPAL & COUNTY ENGINEER

Price 1s Weekly

Volume CXVI, Number 3388, Saturday, 30 March 1957

Professional Engineer
October 31, 1957

From Vision to Achievement*

By D. B. Steinman, LL. D., L.H.D., Litt D., Eng. D., Sc. D.
Consulting Engineer

We are glad to publish this excellent and most inspiring article by Dr. Steinman, Past President and Life Member of A.A.E., because of the extreme interest in science and engineering at this time. We especially suggest that student engineers read it.

EVERY man's philosophy of life is the product of his experiences. This is especially true of the professional man. His faith, his dedication, and his devotion to his profession are the products of the experiences that have shaped his life.

To me, engineering has been a succession of inspiring influences, of impelling ambitions, of obstacles overcome, and of dreams come true. The realization—one after another—of dreams that seemed hopeless leaves me reverent and humble.

* * *

I am proud to belong to a truly great profession—the profession of planners and builders.

The engineer is a builder. He builds his dreams and the dreams of his fellowmen into enduring realities. He harnesses God's magic for building man's dreams. He overcomes obstacles, breaks down barriers, and builds the bridge for the onward march of Civilization.

* * *

Our one lesson from past experience is never to underestimate the future of engineering progress. Each new discovery opens tremendous vistas of further invention and application. The quickening tempo is logarithmic. Each new generation, building on the past, sees more progress in science and engineering than was recorded in all the preceding centuries.

Before the dawn of history, the greatest engineering achievement was the invention and application of the wheel. This was man's first great improvement upon nature. The prehistoric genius who hit upon this apparently simple invention could not have visualized the vast future significance, the amazing vistas of mechanical progress thereby made possible. Hardly any subsequent engineering advance would have been possible without the wheel in its manifold developments, symbolized by all the indispensable wheels of industry, transportation, and power. One invention led to millions of others. If all the wheels used, consciously or unconsciously, in our daily lives where suddenly annihilated, our civilization would collapse.

* * *

Despite occasional myopic prophets who discounted further progress, engineering achievement has advanced at an ever accelerating tempo.

In 1837, a distinguished British scientist, with the odd name of Dionysius Lardner, published a scientific paper in which he proved, with irrefutable mathematical equations nobody could question, that it was impossible to build a steamship capable of a non-stop voyage from England to America. A few months later, on April 24, 1838, the steamer *Sirius* arrived in New York, the first to cross the Atlantic entirely under steam. The ship brought to America copies of Lardner's paper "proving" that such voyage was impossible!

In 1843, Henry L. Ellsworth, U. S. Commissioner of Patents, wrote in his Annual Report to Congress:

"The advancement of the arts, from year to year, taxes our credulity and seems to presage the arrival of that period when human improvement must end."

(*Address at the National Convention of Triangle Fraternity of Engineers and Architects, at the University of Illinois, August 31, 1957.)

ALBERTO FRANCO SCHWARZ

IL PONTE PIÙ LUNGO DEL MONDO

Estratto da "Vie del Mondo" n. 7 - 1957

PENINSULA POETS

Volume XII | Autumn 1957 | Number 4

SING THEN I MUST, UNTIL MY SONG BE HEARD

(Motto of the Poetry Society of Michigan)

ARCH BRIDGE

The high road bears the speeding throngs;
Few see the arching span below.
But for those few the builder wrought
A rainbow in the sunset glow.

—D. B. Steinman

New York City: Dr. David B. Steinman was awarded the degree of Doctor of Letters from Loyola University in June. His citation read, in part: "For his genius in the field of bridge design and for his scientific contribution, for his contributions to the fine arts and his love of beauty."

The Detroit Free Press

SATURDAY, NOVEMBER 2, 1957

BRIDGE GENIUS

'A Dream---But No Mirage'

ST. IGNACE — A diminutive man whose rimless glasses and sun-narrowed eyes are topped by sparse gray hair stood apart for a moment from the officials who thronged the Mackinac Bridge Friday.

He was Dr. D. B. Steinman, New York engineer, renowned the world over as the genius of long-span bridges.

* * *

HE WAS the man who said the Straits of Mackinac could be bridged when the project was only a topic of conversation in Michigan.

"Yes, I can tell you what built this bridge," he said. "It was faith and dreams and prayers."

Steinman, 71, has the penetrating gaze of the visionary, and the stubborn jaw that makes the vision reality. Since 1914 he has built more than 400 bridges that span the rivers and lakes of five continents.

"This is my greatest bridge," he said softly. "My master work."

* * *

TO HIS SIDE then, on the windswept roadway 200 feet above the Straits, came a woman whose small stature blends with Steinman's five-foot six.

"My wife, Irene," Steinman introduced her. "My inspiration for 43 years, and my codesigner."

Steinman said the Mackinac Bridge is the strongest and safest in the world. He explained that a new scientific principle was employed, whereby the stronger the gales blow across the Straits, the steadier the bridge becomes.

"We have utilized the force of the winds to stop oscillation caused by traffic," he said. "It's a brand new principle in scientific engineering.

"We incorporated this principle when we took the dare," he said. "When everybody, even college professors, were shooting off and saying this bridge could not be built.

"It's a dream bridge, yes," he smiled. "But it's no mirage."

* * *

STEINMAN HAS been honored as president, honorary member or fellow of a long list of American and foreign engineering and scientific societies. He holds the French Legion of Honor and awards from eight other European nations and America and Canada. The Steinman's have three children and six grandchildren.

"And what do I do now?" he asked. "Why, there are some people waiting for me to build a bridge."

TO SPAN THE GULF

Across the gulf of ancient fears
We build a gleaming span,
A bridge of hope for future years—
The brotherhood of man.
N. Y. David B. Steinman

I should like to give you some excerpts from a splendid address, "Moral Armor For The Atomic Age", given by **Dr. David B. Steinman,** (our valued V. P. and Life Member from N. Y.) on the occasion of the 40th Commencement of the University of Tampa, Fla., June 6th.

"St. Thomas Aquinas once said that there are only three really important endeavors in life: To have faith in the right things, to hope for the right things, to love the right things in life. Our faith, hope and love for the good, the true and the beautiful find their expression in Science, Religion and Art. These are the three main pillars of civilization. For man's highest fulfillment we must revere all three. . . It has been pointed out that there is a common and unifying element—which we identify instictively as the divine spark—in a Raphael Madonna, a Beethoven symphony, and a discovery by Copernicus, Newton or Einstein. In each instance inspiration was drawn from some common reservoir of spiritual vitality. In each there were moments of flashing intuition that call to mind the Burning Bush that spoke unto Moses. The experience of sudden inner illumination beyond mere intelligence, the inner light known to mystics, martyrs and poets, is not unknown to creative scientists and inventors.. . . In this day of fear, fatigue and frustration, our only invulnerable armor is a genuine spiritual faith and the courage founded thereon. Each good man has in himself a quiet place in which he lives, however seemingly torn by the turmoil and passion of the world. That is his citadel which must be kept inviolate against assault. That quiet place must be founded on a rock and the rock must be a belief—a belief in the existence of the ultimate good and a willingness to put forth his strength against the ultimate evil. . . . As man first made Religion a shield against his ignorance, he now needs, more than ever, Religion as a shield against misuse of his knowledge. . . . We have witnessed the Steam Age, the Atomic Age, the Electric Age. But the basic moral values are ageless. They are the values distilled from man's total experience. Precisely because we now have in our hands such immense natural forces capable of uprooting us; we need a sure anchorage in the soul. We need a renewed and revitalized emphasis on the enduring basic elements, such as truth and justice, loyalty and love. . . . The one outstanding lesson of the present crisis of the human race is that man must relearn humility, reverence and spiritual faith. That is the thought I want to leave with you".—D.B.S.

PARTNERS

The Magazine of Labor and Management

So Let Me Live

By D. B. STEINMAN

So let me live: In passionate belief
That hope is beautiful and love divine;
That life has meaning though our years are brief,
Each soul a part of Heavenly-planned design.

So let me live: With consecrated heart
To help the sorrowing, the lost, the blind;
With reverent faith, thankful to do my part
To leave the world more lovely and more kind.

So let me live: Embattled against wrong
And brave to march with flag of truth unfurled;
Humbly to make my work, my life, a song,
And give undying music to the world.

September

1 9 5 7

THE STATE JOURNAL

LANSING—EAST LANSING, MICHIGAN, TUESDAY, OCTOBER 8, 1957

LIKE A BEAUTIFUL POEM

Mackinac Straits Bridge Was Dreamed by a Poet

MACKINAW CITY, Oct. 8 (AP)—In majestic symmetry, like a beautiful poem, the Mackinac bridge hangs from ribbons of steel between Michigan's two peninsulas.

And in truth, it was dreamed by a poet, who also is an engineer.

He is Dr. David B. (for Barnard) Steinman, a 71-year-old New York consulting engineer who designed it and wrote this verse in his poem, "The Bridge of Mackinac":

"Generations dreamed the crossing:
Doubters shook their heads in scorn.
Brave men vowed that they would build it—
From their faith a bridge was born."

Dr. Steinman was born on New York's lower east side in the shadow of the Brooklyn bridge, and he cannot remember when he was not fascinated by bridges. In all, he has designed more than 300 on five continents.

PLANNING LARGER ONE

The Mackinac now up, he's turning his energies to one which even would dwarf it—a gigantic span across the Straits of Messina joining Italy and Sicily.

Dr. Steinman, one of seven sons of a factory laborer, started his professional career from desk space he rented for $10 a month. But he became the second man to win the National Society of Professional Engineers' award for distinguished service to engineering. The first was Herbert Hoover.

Steinman recalls vividly days when he and a brother hawked newspapers from New York's Park Row in a scramble to help their father meet the $12 monthly rent their three-room flat required.

Despite his family's strained finances, Steinman managed to attend the College of the City of New York and was graduated summa cum laude in 1906. A scholarship enabled him to win his master's degree and a doctorate of philosophy at Columbia university.

TAUGHT IN IDAHO

He found a job as a professor at the University of Idaho. And it was across the Potlacht river in Idaho that he designed his first real bridge in 1912. He was a Scoutmaster and his troop built the cantilever span of logs.

Steinman quit teaching after four years to become a practicing engineer.

With Holton D. Robinson, Steinman entered an international competition to design the Florianopolis bridge in Brazil. Their design, creating four times as great rigidity with two-thirds as much steel, won.

That put the new team at the top of bridge designing firms. Robinson later died, but Steinman never lost that top position.

Chief among his many significant advances in bridge design are the Mt. Hope bridge between Newport and Providence, R. I.; the St. Johns bridge in Portland, Ore.; the Thousand Islands International bridge, and the Mackinac bridge.

Incidentally, the famous "sky ride" at Chicago's world fair was a Steinman creation, and he says it was "nothing more than a suspension bridge of novel design."

The Evening News

SAULT STE. MARIE, MICHIGAN TUESDAY, AUGUST 20, 1957

Dr. David B. Steinman (left) and Mrs. Steinman talk with Mackinac Bridge Authority Chairman Prentiss M. Brown Sr. at the Les Cheneaux Chamber of Commerce banquet Monday evening at Cedarville.

Straits Bridge Held Within Original Cost Estimates, Dr. Steinman Tells Audience

CEDARVILLE—The cost of the Straits of Mackinac Bridge has been reduced by some $30,000,000 from the original $130,000,000 estimate despite rising material costs in the last few years, according to Dr. David B. Steinman, designer and chief engineer of the bridge project.

Steinman, speaking at a Les Cheneaux Chamber of Commerce meeting here Monday evening, cited resourcefulness in design and construction of the bridge as the reasons for the cut in costs.

"This saving in the cost of the bridge was achieved while at the same time securing the largest, strongest, safest and most beautiful bridge ever built," Steinman said.

He emphasized that the bridge would be completed and open to traffic by Nov. 1, as planned four years ago when the structure was still on the drawing board.

He said the structure would be "the greatest suspension bridge in the world for decades to come," and termed the Mackinac Bridge "the prize winner" of the bridges he has designed and built.

Construction of the span has required two million man-hours of engineering work and volumes of engineering computations, four thousand large engineering drawings and a total of 85,000 blueprints, Steinman told the gathering of more than 300 persons.

He said six million rivets and high tension bolts were used on the bridge and each has to be calculated and checked by engineers. Over one million tons of concrete and steel went into the structure along with the labors of more than 10,000 men—about 2,500 employed on the site and the rest in quaries, mines, mills and shops.

Dr. Steinman paid a glowing tribute to the late John T. Nevill of DeTour, his co-author on a recently completed book, "The Miracle Bridge at Mackinac," to be published this fall by the Eerdmans Publishing Co. of Grand Rapids.

Steinman was introduced to the gathering by Prentiss M. Brown of St. Ignace, chairman of the Mackinac Bridge Authority. Dr. Harold Sponberg of Northern Michigan College was toastmaster. Other speakers were Sandy Wells of Cedarville and the Rev. Howard Fehr of Cedarville.

The Daily Mining Gazette

HOUGHTON, MICHIGAN, MONDAY, JULY 29, 1957

Steinman Will Be Honored for Article About Straits Bridge

The Franklin Institute of the State of Pennsylvania will honor an internationally eminent bridge engineer, who has achieved acclaim also as a scientist, inventor, mathematician, artist, educator, lecturer, author, poet and humanitarian.

Dr. David B. Steinman will receive the Louis E. Levy Medal "In recognition of his outstanding paper, 'The Design of the Mackinac Bridge for Aerodynamic Stability,' appearing in the December, 1956 issue of the Journal of The Franklin Institute." Former presentation of the award will be made at the Institute's annual Medal Day ceremonies to be held on Wednesday, Oct. 16. Steinman has also been honored by Michigan Tech.

The Mackinac Bridge, which spans the Straits of Mackinac in Michigan, is the world's largest suspension bridge. Dr. Steinman, in his paper, has given a concise and comprehensive presentation of the scientific principles he has developed in the design and construction of modern long-span suspension bridges and has presented an account of his application of these principles in the design and construction of this new $100,000,000 structure.

The New York Times Magazine
January 5, 1958 SECTION 6

Dreamer In Concrete And Steel

By ROBERT DALEY

THE life of Dr. David Barnard Steinman, foremost builder of bridges in the world today, has itself been a bridge, joining the Battery to the Bosporus, linking poetry in steel and concrete to concrete and steel in poetry.

Few men have lived who could match Dr. Steinman in achievement, and today at 71 he is a happy and contented man. His mighty bridges, more than four hundred of them, bestride great bays and rivers on every continent except Africa. His inventions and dramatic innovations have made spans up to 10,000 feet (the George Washington Bridge's is 3,500 feet) feasible and imminent.

Even the poetry he began writing late in life has been widely loved and extravagantly lauded. He has published a thousand technical papers, a dozen books from biography to poetry, won a score of honorary degrees and received ten times that many citations, medals and awards, sixty-seven of them from foreign countries.

In November Dr. Steinman announced that he had been assigned to build the first intercontinental bridge in history, across the Bosporus between Europe and Asia; presided at the opening of his $100,000,000 "miracle" bridge across the Straits of Mackinac in northern Michigan, and found time to write a birthday poem to his wife which he called "Sonnet at 70."

Meanwhile, work continued on an "interesting" bridge over the Tigris River at Baghdad—"in that romantic region," he says, "where Adam and Eve had their garden. The Iraqi Government was tired of ugly bridges. They wanted a beautiful bridge, and so they called me."

THE dreams of his boyhood have many times come true. One of seven sons of an immigrant laborer, Dr. Steinman grew up in the slums, in the shadow of the Brooklyn Bridge. As he played on and around it, he marveled daily at the beauty and majesty of this "queen of bridges." Small, poor, ill-fed, he vowed that one day he would become a builder of bridges, never realizing the grandeur of this plan. Bridge building is one of the most specialized of all crafts; only a handful of men in the world today are capable of building a large span. "The other children laughed at me. But a few years ago I directed the modernization of the Brooklyn Bridge. And now my name is on a bronze tablet with that of John Roebling, the genius who built it."

A brilliant student, Dr. Steinman at 13 entered City College on a scholarship which allowed him to take courses there while finishing his studies at Evening High School. When scarcely past 20 he was working for three advanced degrees at once at Columbia. He designed the Henry Hudson Bridge at 22. It was his thesis for his civil engineering degree in 1909 and it won him a mark of 100. (When the parkway era came to New York twenty-five years later the bridge was finally built—by Dr. Steinman, just the way he had originally planned it.)

During the next dozen years he worked as an engineer on subway and elevated structures, aided Gustav Lindenthal with the design of the Hell Gate Bridge over the East River and with the Sciotoville Bridge over the Ohio, and put in two long stints lecturing at City College and at the University of Idaho.

It took no courage to strike out on his own in 1920. Out of work three months as a result of the depression then, he was willing to try anything. Desk space cost $10 a month. "The first month I earned nothing, the second month $5, the third $250 for writing a survey, the fourth $400 for inspecting forty railroad bridges."

MASTER AND MASTERPIECE—David B. Steinman looks up from a boat at Mackinac Bridge, his and the world's longest bridge.

HE was 35, and still hadn't built a bridge of his own, when Holton D. Robinson, builder of the Williamsburg and Manhattan Bridges, suggested they collaborate on an entry in an international competition for a suspension bridge at Florianópolis, Brazil. Dr. Steinman worked out the basic design for the bridge that not only would be beautiful but would use only two-thirds as much steel while yielding a fourfold increase in rigidity. This design won the competition.

In the years that followed, his bridges spanned harbors, bays and rivers in twenty-one countries on five continents, and in states from Rhode Island to Oregon.

He is an uncommon man—part mathematician, part artist, part politician. And he has been a man of incredible energy. He traveled 20,000 miles a year to organize the National Society of Professional Engineers. He has conducted what he calls "a one-man international campaign for beauty in bridges," emphasizing beauty not only in structure but in color and artistic lighting, too. During the depression he spoke out earnestly, and often, for an expansion of credit, pleading that construc-

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The American Bard

January. February. March. 1958

Hart Crane and The Bridge

He felt the incantation of the span
That arched above the harbor and its sounds.
For his compelling fever to create
A rhythmic order from the chaos-maze,
He found the vision and the symbol here—
The parabolic arc that man had spun
To pierce the blue above the city's tides.

Some vibrant spirit-echoes lingered there—
The house, the very room, within whose walls
Another human in travail had dwelt
And made his bid for immortality.
From this same attic on the Brooklyn shore,
Through years of racking pain and lonliness,
The stricken builder of the Bridge had watched
His dream take shape in stone and gleaming steel.

With quickened flame the poet's flight was
launched.
Of cities and the prairie road he sang,
Of iron rails and workers in the fields,
Of farmboy memories of star and lake,
Of ribald South Street and the sailor's chants,
Of Istanbul, Atlantis, and Cathay.

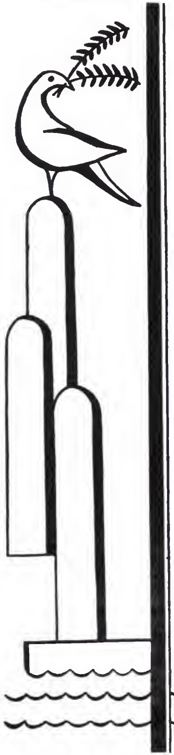
In sturdy, singing cadence like the march
Of pioneers across the western plains,
A nation's cavalcade from sea to sea,
He hymned the Bridge and heard its choiring
strings,
A link of strength to vault a continent
And leap through space to reach that inward goal,
Fulfillment of man's hunger of the soul.
He saw the naked power of machines.
Emerge from tunnel darkness into light,
Transmuted like the Bridge in skyward curve,
A godlike hand to liberate man's wings
And lift him to the stars.

His flight was done;
Now weary, spent, the lyric voice was mute.
Still tortured by a strange, consuming fire,
Southward he sailed to end his frenzied course
In one last leap into the sea he loved.

—David B. Steinman

FEBRUARY, 1958

the MAGNIFICAT



My Lowly Part

D. B. STEINMAN

I planted a seed and added my love
To the sunshine and life that came from above.
I thrilled to behold how Thy magic power
Made each bud unfold as a beautiful flower.

I quarried the rock and carved it with care
To build a cathedral for worship and prayer.
My soul sang Thy story — compassion divine —
As I wrought for Thy glory a reverent shrine.

A flower, a song, or a soul-lifting shrine —
My own share is humble, the magic is Thine,
Though lowly my part, I am thankful to be
A tool in Thy Hands — co-working with Thee.

Erecting the Superstructure of Mackinac Bridge

AN ENGINEERING NEWS-RECORD REPRINT

February 6, 1958

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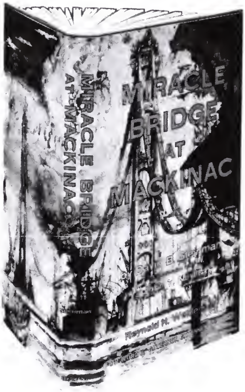
MIRACLE BRIDGE AT MACKINAC

by its Chief Designer

DR. DAVID B. STEINMAN

Written in Collaboration with John T. Nevill,



Foreword by

GOVERNOR G. MENNEN WILLIAMS

This beautiful volume is the complete AUTHORITATIVE story of the history, construction and meaning of the Mackinac Straits Bridge in Michigan's Hiawathaland.

It is the fascinating story of "the bridge that couldn't be built" but was — at a cost of $100,000,000 and with piers and anchorages made more lasting than the ancient pyramids of Egypt, and with towers 552 feet high and reaching 210 feet down into underwater gorges.

It is the story, too, of man's conquest over nature, of his enduring spirit which prevails in spite of obstacles and failure, and of his desire to be a neighbor.

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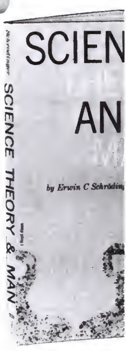

SCIENCE, THEORY AND MAN
by Dr. Erwin Schroedinger

This is an unabridged, unaltered reproduction of Nobel Laureate Schroedinger's well-known SCIENCE AND THE HUMAN TEMPERAMENT, now enlarged by the addition of a new 30-page chapter, WHAT IS AN ELEMENTARY PARTICLE.

Written on an intermediate level — neither too advanced for the layman, nor too elementary for the physicist or specialist in history or philosophy of science — this volume considers the problems and implications which have emerged from the new physics.

In the first chapter, SCIENCE, ART AND PLAY, Dr. Schroedinger analyzes the role of the play function in creativity and basic research, the development of experiment, and the role of authority in science. Following chapters, THE LAW OF CHANCE, INDETERMINISM IN PHYSICS, WHAT IS A LAW OF NATURE, discuss experiments and theories of modern physics which have cast doubt upon the classical physical concept of the universe.

Other chapters, such as IS SCIENCE A FASHION OF THE TIMES and PHYSICAL SCIENCE AND THE TEMPER OF THE AGE, are of paramount importance as discussions of one of the most important aspects of scientific method and philosophy of science: how far is science conditioned, formed, and even held in error by the cultural perceptions and limitations of each period?

CONCEPTUAL MODES IN PHYSICS AND THEIR PHILOSOPHICAL VALUE, WHAT IS AN ELEMENTARY PARTICLE, and the Nobel Address (1933) THE FUNDAMENTAL IDEA OF WAVE MECHANICS discuss problems which have arisen from Heisenberg's uncertainty, Dirac-Fermi statistics, and similar work.

This book is most unusual in covering the most advanced material in modern theoretical physics in a form which almost any intelligent reader can follow. No mathematics beyond high school algebra is needed to follow the presentation, except for two or three pages where some elementary calculus is desirable. Dr. Schroedinger draws for illustrations upon such matters as behavior of gases, hydrodynamics, electromagnetism, subatomic phenomena, astronomy, and relativity. He ranges over the work of such men as Newton, Exner, Galileo, Grimaldi, Mach, Planck, Poincaré, Gauss, Einstein, Heisenberg, Bohr, Hamilton, Rutherford, Dirac, and many others.

"Most readable . . . lively, . . . provocative," NATURE [London]. "Of much interest . . . [you] will read these charming and simply-written essays with much pleasure and interest," Lord Rutherford.

Preface by Lord Rutherford. Biographical introduction by James Murphy. 223pp. $5\frac{3}{8} \times 8$. T428 Paperbound

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MATHEMATICS IN ACTION
by Sir Oliver Sutton

Anyone who still retains a good command of high school algebra will find this volume a very clear and ample introduction to the ways that higher mathematics are applied to phenomena of the universe about us.

The author, who is a noted British mathematician, and director of the Meteorological Office, first presents a lucid account of mathematical tasks and tools. In clear easy-to-follow accounts he discusses number systems, vectors, non-Euclidean geometry, infinitesimal calculus, differentials, differential equations, and similar topics in philosophy of mathematics and mathematics. In each section he develops his material in sufficient detail that it can be followed without reference to other books.

Dr. Sutton then discusses ballistics, or the application of Newtonian dynamics to war, and offers a currently important explanation of the behavior of projectiles in vacuo, in air, calculation of trajectories, and other topics. Calculating machines are then explained, with analogue and non-analogue machines.

Waves and wave-like phenomena are then discussed, with a thorough elementary analysis of the Fourier series, and its application to sound, radio signals, and electrons. The significance of such advanced matters as Planck's constant, groups, eigenfunctions, and eigenvalues is made clearly and concisely. A chapter is devoted to statistics, or the weighing of evidence, with sections on distributions, dispersion, correlation and sampling.

Specially interesting are chapters on the mathematics of flight and on meteorology, which are based in part upon Dr. Sutton's own noteworthy contributions. They include a mathematically simplified description of the theory of fluid flow, and the relation of special problems of atmospheric phenomena to general theory of fluid motion. His development of such topics as streamlines, maps, patterns of irrotational motion, the origin of lift, Joukowski's solution of the two-dimensional airfoil problem, and the theory of finite airfoils is probably the only satisfactory treatment of these difficult subjects on an intermediate level. An excellent introduction to the nature and procedure of modern numerical weather forecasting is also included.

Besides being a most unusual book for the intelligent layman who has had little or no advanced mathematics, this is also an excellent book for the scientist or mathematician, who is interested in the application of mathematics to special practical areas.

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STEINMAN-WATSON

APR 16

The Ice Cream Vendor Of Sorrento

By D. B. Steinman

I was strolling to buy a memento
On the sun-dazzling beach of Sorrento
By the blue Neapolitan sea,
When the sweet strains of SANTA LUCIA
Drew my eyes to a GELATERIA
On the rocks near the ferryboat quay.

At the flower-draped booth the young vendor,
In accents appealing and tender,
Entreated the folks passing by:
"Get some ice cream, SIGNORE, SIGNORI,*"*
Until twilight on red wings of glory
Overspread the cerulean sky.

But the strollers went by without heeding
The desperate note of his pleading
And the lure of the gramophone's tune;
When the gold of the sunset departed,
The youth stood alone, broken-hearted.
In the sadly-sweet light of the moon.

Prize Poem
Reprinted from
Wisconsin Poetry Magazine

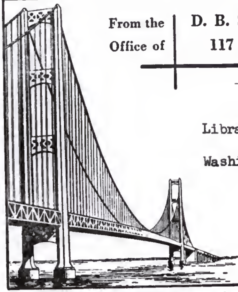
I Wish I Were A Minstrel

By D. B. Steinman

I wish I were a minstrel, dear,
To charm you with my lyric art;
Then in my singing you would hear
The love-song ringing in my heart.

But lacking music for my words
To thrill you as I long to do,
I ask the golden-throated birds
To sing my throbbing song to you.

Reprinted from
Scimitar and Song



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Death Of A Bridgebuilder

By D. B. Steinman

He saw it clearly and clairvoyant bright:
Twin granite pylons, shafts against the sky,
Founded on rock beneath the water swirl;
The lofty cables, spun of cold-drawn steel,
In symmetry of parabolic arcs;

The wizardry of radiating stays,
A geometric web to hold the stars;
The titan uplift of the singing strands;
High Gothic portals framed in stone – all these
He planned in blueprint, accurate as truth.

He did not live to set the caissons down.
The shadow of a fear that builders know
Was myth made real: A BRIDGE DEMANDS A LIFE,
To pacify the hunger of the flood.
The span of hope became the bridge of death.

Reprinted from
Voices – A Journal of Poetry

"THIS *article is based on one which appeared in the October, 1956 issue of "Popular Science". It tells of David B. Steinman and his childhood inspiration — the Brooklyn Bridge — which led him to become the master bridge builder. The United States Information Agency in "America Illustrated" has published the story for distribution in Russia as an example of the American way of life".*

Sonderdruck aus der Zeitschrift
„Bauplanung – Bautechnik" 11. Jg. (1957) Heft 7
Seite 301 bis 307

Dr.-Ing. D. B. STEINMAN,
Beratender Ingenieur, New York

Wie die Mackinac-Brücke ihre aerodynamische Stabilität erhielt

DK 624.28 620.178 3

Bild 1. Perspektivische Zeichnung der Mackinac-Brücke. Die Hängebrücke ist 2650 m lang und hat eine größte Spannweite von 1158 m

Die seit 1954 mit einem Kostenaufwand von 99,8 Mill. Dollar in Bau befindliche Mackinac-Brücke in Michigan stellt einen Triumph der neuen Wissenschaft von dem aerodynamischen Verhalten der Hängebrücken dar. Der Entwurf der Hängebrücke mit einer größten Spannweite von 1158 m wurde auf wissenschaftlichem Weg in der endgültigen Form festgelegt, ohne daß mehrere Jahre mit tastenden Untersuchungen verloren gingen, ohne entsprechende Vorversuche und nachfolgende Änderung des Entwurfs, um eine aerodynamische Instabilität zu überwinden. Zwei Jahre, nachdem der Entwurf (Bild 1) angenommen wurde und Bauverträge von Rekordhöhe abgeschlossen worden sind, sind nun ausgedehnte Windkanalversuche an einem großmaßstäblichen, dynamischen Modell der Brücke durchgeführt worden. Dabei stellte sich heraus, daß keinerlei Änderung an dem ursprünglichen Entwurf des Verfassers notwendig oder wünschenswert war. Die Windkanalversuche zeigen überzeugend, wie von dem Verfasser vorausgesagt wurde, daß der ursprüngliche Entwurf der Mackinac-Brücke in vollem Umfang eine vollständige Stabilität gegen alle Arten und Formen von Schwingungen (senkrechte Schwingungen, Drehschwingungen und gekoppelte Schwingungen) bei allen Windgeschwindigkeiten und allen Anströmwinkeln aufweist.

Diese für den Entwurf der Mackinac-Brücke erzielten Versuchsergebnisse können in die einfache Feststellung „vollkommene aerodynamische Stabilität" zusammengefaßt werden. Dieses Ziel ist niemals zuvor bei irgendeinem früher untersuchten Brückenquerschnitt erreicht worden, noch ist man diesem nahegekommen.

Mit der überraschenden Zerstörung der Tacoma Narrows-Brücke im Jahre 1940 durch anfachende verhängnisvolle Schwingungen bei einem mäßigen Wind, wurden sich die Ingenieure der gebieterischen Notwendigkeit, bei einem Brückenentwurf die aerodynamischen Probleme zu betrachten, bewußt. In dem Bestreben, diesen mächtigen zerstörenden Gewalten Einhalt zu gebieten, führen die einleuchtenderen elementaren Methoden, die gewöhnlich verfolgt werden, leicht zu Bauwerken, die unnötig hoch bezüglich der Kosten und plump in den Abmessungen sind. Bei der Mackinac-Brücke wurde ein anderer Weg eingeschlagen. Eine Brücke von idealer, unzweifelhafter aerodynamischer Sicherheit ist, ohne Ersparnisse oder elegante Maßverhältnisse zu opfern, erreicht worden. Durch einen wissenschaftlich durchdachten Entwurf, durch Anwendung der neuen Erkenntnisse über das aerodynamische Verhalten von Hängebrücken, besonders nach den Forschungen, Ansätzen und Grundsätzen für den Entwurf des Verfassers, wurde die Mackinac-Brücke zu der aerodynamisch standfestesten Hängebrücke gemacht, die jemals gebaut wurde.

Dieses Ergebnis wurde nicht dadurch erreicht, daß Millionen von Dollar dafür ausgegeben wurden, um ein Bauwerk zu errichten, das durch Gewicht und Steifigkeit den Wirkungen widersteht, sondern durch wissenschaftliche Ermittlung des Querschnitts, um die Ursache der aerodynamischen Instabilität auszuschalten. Den senkrecht und verdrehend wirkenden aerodynamischen Kräften, die dazu neigen, Schwingungen zu erzeugen, wird nicht nur entgegengetreten, sondern sie werden mit wissenschaftlichen Methoden ausgemerzt.

Die vorliegende Abhandlung wurde geschrieben, um die Grundprinzipien und die einfachen Verfahren, durch die diese Ergebnisse erzielt wurden, darzustellen und zu erklären.

1. Die Grundprinzipien

Das wissenschaftliche Werk eines wirtschaftlichen Entwurfs von vollständiger aerodynamischer Stabilität für die Mackinac-Brücke ist eine Bestätigung der Richtigkeit der wissenschaftlichen und mathematischen Schlußfolgerungen des Verfassers und der Grundprinzipien, die der Verfasser entwickelt und ständig in allen Veröffentlichungen während der 17 Jahre seiner Forschung über diese Frage vertreten hat.

JOHN ROEBLING - DER BRÜCKENBAUER

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1820 wanderte der deutsche Ingenieur Johann A. Raebling aus nach den USA. Er wurde der Pianier amerikanischer Brückenbaukunst. Nur in den Vereinigten Staaten fand er die Freiheit und die „unbegrenzten Mäglichkeiten" für sein gewaltiges Werk.

Roebling begann mit 20 Jahren. Er hatte Ideen. Er wollte große Brücken bauen. Der Gedanke, eine Brücke aufzuhängen, hatte Ihn begeistert. Sa war auch seine Erfindung des Drahtseiles nur noch eine Frage der Zeit. Denn dieses Drahtseil erst ermäglichte den Bau graßer Hängebrücken

‚Das praktische Genie", wie ihn hundert Jahre später der „Oregan Statesman" nannte, war mehr als ein begabter Ingenieur und Organisatar. Er beherrschte drei Sprachen, war ein varzüglicher Musiker, liebte als Schüler Hegels die Philasaphie und galt als glänzender Mathematiker. — Im letzten jedach blieb er ein Mensch. Mit einem Tagesgehalt van vier Dollar begann er, Kanäle, Viadukte und Brücken zu bauen, erfand „nebenbei" neue Kesselkanstruktionen für die ersten Dampfschiffe, Dampfpflüge, Sicherheitsventile, Schiffsschrauben und machte die ersten Varschläge für ein Transazeankabel.

Sa beginnt die dramatische Geschichte der Braaklyn-Brücke und ihrer Erbauer, Jahn Raebling und Sahn. Es ist das Epos eines Mannes, der mit unglaublicher Zähigkeit und unter Einsatz seines Lebens die gräßte Hängebrücke seiner Zeit schuf.

Ein faszinierendes Buch . . . es schrieb D. B. Steinman, prädestiniert wie kein anderer. den graßen Raebling und seinen Sohn zu schildern. Denn der Autar gehärt selbst zu jener kleinen Elite begabter Brückenbauer, van denen die Welt spricht. Steinmans neuester Auftrag: Die gräßte Hängebrücke des 20. Jahrhunderts über die Straße van Messina

WERNER-VERLAG GMBH · DÜSSELDORF

Child Of Ishmael

By D. B. Steinman

Your infancy beheld a world that smiled,
And you smiled back – a happy, laughing child.

Too soon the years despoiled your paradise
Sheltered by love and hymned by lullabies.

Your tragedy is etched upon your face,
Pariah, branded for your alien race.

The cross of fire becomes a blasphemy –
Man's blazing boast of inhumanity.

Child of Ishmael, hounded by the pack,
Your only crime is that your skin is black.

Reprinted from
Wisconsin Poetry Magazine

The Fool Hath Said In His Heart *

By D. B. Steinman

The fool hath said in his heart: There is no God —
And knaves tear down the altars of our faith;
Without Thy spark they make of man a clod,
A thing of doom and barren aftermath.

How pitiful the blind, but none more mean
Than they who teach the sightless to deny
The glowing radiance of things unseen,
The glory of the rainbow-splendored sky.

The fools and knaves who scatter seeds of hate,
Their blinded slaves and Godless retinue
Who hide Thy light to build a soulless state —
Father forgive, they know not what they do.

*Psalms 14:1

Reprinted from
Scimitar and Song

MAJOR CHANGES LISTED

The major changes in dependents' and survivors' benefits are:

(a) A retired worker's wife who is under 65 can receive benefits if she has a child in her care.

(b) The benefit for a dependent parent has been raised to three-quarters of the "primary" benefit of the wage earner (it has been one-half).

(c) Lump-sum death payments, though reduced to three times the "primary benefit" of the wage earner, are now payable to the family of every insured worker. Formerly, these payments were made only when no other member of the family was entitled to survivors' benefits at the time of the wage earner's death.

(d) Retired workers, survivors, or dependents may now earn $50 a month (as against $14.99 under the present law) without losing their benefit privileges.

NEW LAW A LANDMARK IN SOCIAL LEGISLATION

This new social security law is a landmark in the field of social legislation. The improvements in our social insurance system which it brings about are long overdue. In my opinion, they do not go far enough. I believe that our insurance system should include the permanently and totally disabled, who are entitled to security as a matter of right, and not a matter of charity. I believe that the system should extend to all working men and women—for old age is a problem shared by all Americans alike. I believe that the retirement age for women should be lowered from 65 to 60. I believe that all insured workers should receive a minimum benefit of $75.

All of these provisions are contained in a social security bill which I introduced early this year.

We have taken a great step forward, but there is still room for progress and improvement. There is still a challenge for the future.

"The Span Thus Built of Priceless Parts, of Love Divine in Human Hearts, Has Strength No Evil Force Can Sever—the Bridge of Kindness Lasts Forever"

EXTENSION OF REMARKS

OF

HON. FRANCES P. BOLTON

OF OHIO

IN THE HOUSE OF REPRESENTATIVES

Thursday, August 10, 1950

Mrs. BOLTON of Ohio. Mr. Speaker, it was an inspiration to read in the August 1950 issue of the magazine American Engineer a poem written by Dr. David Barnard Steinman, internationally known bridge engineer and author of many books on bridge design, construction, and direction.

It is significant indeed that this message on the spiritual ingredients of a bridge "to span the gap from man to man" should have come from the pen of a man who has participated in the design and construction of such imposing structures as the Tri-Borough and Henry Hudson Bridges in New York City, the Cologne-Mulheim Bridge over the historic Rhine; the Florianopolis of Brazil, largest suspension bridge in South America; the Thousand Islands International Bridge over the St. Lawrence River—bridges, in fact, in five continents of our troubled world.

Dr. Steinman, honorary life member of the New York State Society of Professional Engineers, has given us a beautiful and timely message in his poem, The Bridge, and I ask that it now be made a permanent part of the CONGRESSIONAL RECORD so that the Members of this and the other body, together with the countless readers of our proceedings, may have the benefit of reading it.

THE BRIDGE

(By Dr. D. B. Steinman)

(Editor's Note: Below is a poem written by Dr. D. B. Steinman, internationally known bridge engineer, and first president of NSPE.)

In days gone by, a valiant band,
With consecrated heart and hand,
Set out as pilgrims, seeking ways
To pierce the wilderness of fear,
To bring the distant places near,
To build new roads to brighter days.

Through field and forest, hill and vale,
They cleared a path and blazed a trail.
In heat and frost, they toiled each day
To make more smooth and safe the road,
To ease the heartache and the load
For others who would come that way.

One night the pilgrims reached the rim
Of canyon deep and torrent grim,
With alien tribes on farther side.
The need was clear—a mighty span,
A link of peace uniting man,
Built high above the swollen tide.

The pilgrims built a bridge of wood:
In massive strength the great span stood.
But ere the bridge with load was strained,
A fiery spark fell on the span
And flames consumed this work of man—
Then naught but glowing ash remained.

The pilgrims labored to atone:
This time they built a bridge of stone.
But ere the builders' thrill had waned,
A sudden earthquake heaved the ground
And felled the bridge, with crashing sound—
Then naught but rubble heap remained.

Imbued with unabated zeal,
The pilgrims built a bridge of steel.
But as their eyes aloft were trained,
A thing of terror, hurtling past,
Dissolved the bridge in fission blast—
Then naught but vapor glow remained.

The pilgrims now were sad of heart.
Their best was spent of skill and art,
Yet all their work had come to naught.
What part was missing in their plan?
How could they build a lasting span
To reach the goal their toil had sought?

While hearts were heavy with despair,
There came an answer to their prayer.
As clouds rolled back before their gaze,
A radiant vision met their eyes—
A rainbow span across the skies,
Resplendent in its glowing rays.

And as they gazed with wonder high,
They heard a voice speak from the sky:
"To span the gap from man to man,
Construct a bridge not made by hands,
Not wood or stone or iron bands—
Of human kindness build the span!"

The pilgrims' hearts with hope were fired;
With prayer they turned to task inspired:
By overcoming human blindness,
By giving loving thought to others,
By treating all men as their brothers,
They built the bridge of human kindness.

And there the span of spirit stood,
Conjoining men in brotherhood,
Uniting men in love supernal.
Fierce storms may rage and lightning flash,
Wild floods may swirl and earthquakes crash—
But naught can shake the span eternal.

The span thus built of priceless parts—
Of love divine in human hearts—
Has strength no evil force can sever.
The dream of heaven-inspired sages,
The prayer of mankind through the ages—
The bridge of kindness lasts forever.

Indeed, It Is Time

EXTENSION OF REMARKS

OF

HON. HAROLD H. VELDE

OF ILLINOIS

IN THE HOUSE OF REPRESENTATIVES

Wednesday, September 13, 1950

Mr. VELDE. Mr. Speaker, under leave to extend my remarks in the RECORD, I include the following editorial from the Peoria Journal of September 11, 1950, entitled "Indeed, It Is Time."

INDEED, IT IS TIME

Addressing the convention of the Illinois department of the American Legion in Chicago last week, Governor Stevenson presented a plea for a cessation of criticism of the administration of President Truman.

"It is time now to close ranks and put an end to strikes, to recriminations, to political charges and countercharges," he said. "It is time to stop fighting each other and start fighting the common enemy."

The governor thus echoed the administration line that decries any criticism of its bungling as an attack upon the whole country. Mr. Truman and Governor Stevenson expect the people of the United States to blindly and uncomplainingly follow the blundering policy that has placed this country needlessly in a most precarious position.

Indeed, it is time for a closing of ranks and a determining to face up to the "common enemy" and to actually begin doing something to defeat that enemy. It is time that the administration that Governor Stevenson attempts to defend began delivering the goods and giving the people of the United States something they can support instead of fumbling along and plunging the Nation totally unprepared into a bitter, bloody war. It is time for the leaders the governor wants us to follow to stop coddling and ignoring the Communists within their ranks and to begin doing something to oust them from positions where they can carry on their destructive work.

Governor Stevenson and the Democratic politicians seem to believe that anyone who doesn't agree entirely with them is working against the best interests of the United States. They believe that unless we swallow down without gulping the colossal bungling indulged in by such men as Secretaries Johnson and Acheson and the even greater mistakes of Harry Truman that we are sabotaging the effort to preserve America.

Loyalty to the United States and support of the Government do not remove the right and the duty to criticize and assail stupid blunderers and disloyal agents of the enemy who are leading the way straight to destruction. Indeed there is more loyalty in the man who has the courage to stand up and cry out against the selfish efforts of petty men in high places to gain political advantage at the expense of their country, than there is in the submissive acceptance of in-

Beyond The Fog

By D. B. Steinman

Alone upon a rocky knoll I stand
Enveloped by unfathomable mist;
I hear the muffled echo of my voice
And nothing more. My groping senses strain
But cannot reach beyond the here, the now.
And yet I know that high above the haze
There is a radiance that can pierce the dark:
Beyond the fog there is a heavenly light;
Beyond the gloom, a glorious tomorrow.

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